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OFFICIAL GAZETTE

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PATENTS

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May 9, 1978 Volume 970 Number 2

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A recent change of supplier furnishing printing and distribution services has caused delays in the availability of patent copies.

The Patent and Trademark Office regrets the delays and, with the cooperation of the U.S. Government Printing Office, has initiated a concerted effort with the supplier to overcome these delays. The timely availability of patent copies will be attained as soon as possible.

Apr. 18, 1978.

RICHARD J. SHAKMAN,
Assistant Commissioner for Administration.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,237,438, P. A. Tesson, PIPE LINE LAYING APPARATUS, **filed** Sept. 26, 1977, D.C., S.D. Tex. (Houston), Doc. CA H–77–1607, *Santa Fe International Corp.* v. *Martech International, Inc.*

3,347,043, E. G. Freese, MASTER CYLINDER CONSTRUCTION AFFORDING AUTOMATIC RE-PHASING OF MASTER AND SLAVE CYLINDERS; **Re. 28,695,** same, **filed** Oct. 26, 1977, D.C. Nebr. (Omaha), Doc. CV–77–0–378, *The Cessna Aircraft Co.* v. *Gould, Inc.*

3,486,495, H. W. Allen, ARCHERY BOW WITH DRAW FORCE MULTIPLYING ATTACHMENTS, **filed** Nov. 2, 1977, D.C., W.D. Wis. (Madison), Doc. 77–C–396, *Allen Archery, Inc.* v. *Outers Laboratories, Inc.*

3,530,341, R. C. Hutchinson, FLEXIBLE TAPE OPTICAL PROGRAMMER, **filed** Nov. 21, 1977, D.C., S.D. Calif. (San Diego), Doc. 77–0734–N, *Richard C. Hutchinson* v. *Iveron Corp.*

3,685,045, J. J. Pastoriza, DIGITAL-TO-ANALOG CONVERTERS; **3,747,088,** same, SOLID STATE DIGITAL-TO-ANALOG CONVERTER; **3,803,590,** same, CONSTANT-CURRENT DIGITAL-TO-ANALOG CONVERTER; **3,978,473,** same, INTEGRATED-CIRCUIT DIGITAL-TO-ANALOG CONVERTER; **4,020,486,** same, SOLID STATE DIGITAL-TO-ANALOG CONVERTER; **Re. 28,633,** same, **filed** Aug. 24, 1977, D.C., N.D. Calif. (San Francisco), Doc. C77–1877–SC, *Analog Devices Incorporated* v. *Burr-Brown Research Corporation.* Case transferred to U.S. District Court, Arizona, Nov. 21, 1977. **Same, filed** Nov. 29, 1977, D.C. Ariz. (Tucson), Doc. C77–269–Tuc–WCF, *Analog Devices, Incorporated* v. *Burr-Brown Research Corporation.*

3,716,977, H. P. Jackson, GRASS CATCHER ASSEMBLY, **filed** May 19, 1977, D.C., N.D. Ga. (Atlanta), Doc. C77–828A, *McDonough Power Equipment, Inc.* v. *Sears, Roebuck and Co.*

3,749,003, Wilkes and Jones, SEED COTTON HANDLING APPARATUS, **filed** May 20, 1977, D.C., E.D. Calif. (Fresno), Doc. F–77–94–C, *Cotton Incorporated* v. *Taylor Machinery Corp. and Clyde L. Taylor.* Judgment by consent that final judgment on complaint and counterclaims are in favor of plaintiff and against defendant. Patent is valid and owned by plaintiff. Defendants has infringed said patent and are enjoined from manufacturing, using, etc. said patent, Nov. 14, 1977.

3,803,590. (See 3,685,045.)

3,897,597, D. R. Kasper, FACE AND HEAD PROTECTOR, **filed** Dec. 2, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c4486, *Margaret Elizabeth Kasper* v. *Herman's World of Sporting Goods and MGS Incorporated.*

3,922,876, Wetherington, Jr., McKay and Burgess, ENERGY CONSERVATION UNIT, **filed** Nov. 23, 1977, D.C., M.D. Fla. (Orlando), Doc. 77–484–Orl–CR, *Energy Conservation Unlimited, Inc.* v. *William Clark, doing business as HRU and Coast Line Distributing of Orlando, Inc.*

3,928,933, T. Iwamoto, HOLDING TOY, **filed** Nov. 23, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–4393–R, *ITI Hawaii Inc. et al.* v. *Andrew Kim.*

3,978,473. (See 3,685,045.)

4,011,431, M. L. Levin, ELECTRIC COOKING APPLIANCE WITH REVERSIBLE GRILL; **D–240,993,** same, ELECTRIC FOOD COOKER, **filed** Oct. 11, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c3764, *Northern Electric Company and Oster Corp.* v. *Scovill Manufacturing Company.*

4,020,486. (See 3,685,045.)

Re. 28,633. (See 3,685,045.)

Re. 28,695. (See 3,347,043.)

D. 240,993. (See 4,011,431.)

D. 242,573, P. G. Kelman, EARRING, **filed** Nov. 10, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–4217–MML, *Pepi Kelman* v. *Tony Jewelers.*

D. 243,032, D. R. Hodges, PLANTER. **filed** Nov. 11, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–4234–WPG, *Fitz and Floyd, Inc.* v. *Maurice Ceramics of Calif., Inc. et al.*

D. 243,217, E. E. Warsaw, SOFA, **filed** Nov. 25, 1977, D.C., M.D. Calif. (Greensboro), Doc. C–77–0557–S, *Sheffield Furniture Corp.* v. *Carter Industries, Inc. and Heritage House Furniture, Inc.*

D. 244,647, G. Offredi, ARMCHAIR, **filed** Nov. 11, 1977, D.C., M.D.N.C. (Greensboro), Doc. C–77–532–G, *Fratelli Saporiti Industria Arredamenti Di Saporiti and Sergio E. Giorgio S.N.C.* v. *Braden International, Inc.*

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

P. 4,146, Re. S.N. 878,330, Filed Feb. 16, 1978, Cl. Plt./65, *ILEX VERTICILLATA* BUSH NAMED WINTER RED, Robert C. Simpson, Owner of Record: *Inventor,* Attorney or Agent: Charles W. Rummler, et al., Ex. Gp.: 337

3,092,722, Re. S.N. 885,794, Filed Mar. 13, 1978, Cl. 250/77, SPECTRO-PHOSPHORESCENCE MEASURING INSTRUMENT, Hugh K. Howerton, Owner of Record: *Baxter Travenollaboratories, Inc., Deerfield, Ill.,* Attorney or Agent: Paul C. Flattery, et al., Ex. Gp.: 256

3,342,823, Re. S.N. 877,745, Filed Feb. 14, 1978, Cl. 260/279 R, PREPARATION OF QUINACRIDONES, Chi K. Dien, Owner of Record: *Harmon Colors Corporation, Haldeon, N.J.,* Attorney or Agent: Allan R. Plumley, et al., Ex. Gp.: 122

3,799,362, Re. S.N. 880,865, Filed Feb. 23, 1978, Cl. 214/1 D, SIX WHEEL MATERIAL HANDLING VEHICLE, Norman Dean Oswald, et al., Owner of Record: *Standard Manufacturing Company, Incorporated, Dallas, Tex.,* Attorney or Agent: D. Carl Richards, et al., Ex. Gp.: 314

3,920,975, Re. S.N. 875,660, Filed Feb. 6, 1978, Cl. 235/153 AK, DATA COMMUNICATIONS NETWORK REMOTE TEST AND CONTROL SYSTEM, Larry F. Bass, Owner of Record: *Rockwell International Corporation, El Segundo, Calif.,* Attorney or Agent: Howard R. Greenberg, et al., Ex. Gp.: 236

3,922,867, Re. S.N. 857,048, Filed Dec. 2, 1977, Cl. 61/45 B, FRICTION ROCK STABILIZERS, James J. Scott, Owner of Record: *Deborah Lane Castle 5%, Milford, N.J.; Wendy Oteria Carter 5%, Viburnum, Miss.; Amy Jo Sansotta 5%, Fairfax, Va.; Edna M. Scott 5%, as trustee for Polly Sue Scott and James Matthew Scott; Rolla, Miss.,* Attorney or Agent: David W. Tibbott, et al., Ex. Gp.: 351

3,936,193, Re. S.N. 812,590, Filed Jul. 5, 1977, Cl. 356/106, MULTIPLEX INTERFEROMETER, Gerald L. Auth, Owner of Record: *Eocom Corporation, Newport Beach, Calif.,* Attorney or Agent: Paul D. Flehr, et al., Ex. Gp.: 257

3,937,160, Re. S.N. 880,813, Filed Feb. 23, 1978, Cl. 112/79 FF, YARN CONTROL AND FEEDING APPARATUS, Abram N. Spanel, et al., Owner of Record: *Abram N. Spanel, Princeton, N.J.,* Attorney or Agent: J. Rodman Steele, Jr., Ex. Gp.: 353

3,944,400, Re. S.N. 885,592, Filed Mar. 13, 1978, Cl. 55/21, METHOD AND APPARATUS FOR SEPARATING GASES, Graham Bird, Owner of Record: *Petrocarbon Developments Limited, Manchester, England,* Attorney or Agent: Alvin Browdy, et al., Ex. Gp.: 176

3,945,065, Re. S.N. 887,465, Filed Mar. 16, 1978, Cl. 7/14.3, LUMBERING TOOL, Victor A. Dushku, Owner of Record: *Inventor,* Attorney or Agent: D. C. Roylance, et al., Ex. Gp.: 323

3,976,348, Re. S.N. 876,584, Filed Feb. 10, 1978, Cl. 339/74 R, ELECTRICAL TAB RECEPTACLE, Reginald John Simmons, Owner of Record: *AMP Domestic, Inc., Wilmington, Del.,* Attorney or Agent: William J. Keating, et al., Ex. Gp.: 325

3,977,781, Re. S.N. 878,745, Filed Feb. 17, 1978, Cl. 355/18, EXPOSURE SYSTEM FOR ELECTROPHOTOGRAPHIC COPYING APPARATUS, Rudolf Eppe, et al., Owner of Record: *AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany,* Attorney or Agent: Michael J. Striker, et al., Ex. Gp.: 211

3,984,849, Re. S.N. 879,731, Filed Feb. 21, 1978, Cl. 354/100, PHOTOGRAPHIC COLOR SEPARATION EQUIPMENT, Emile Armand Henri Guillaume, Owner of Record: *Zelacolor Systems Establishment, Vaduz, Liechtenstein,* Attorney or Agent: Sidney G. Faber, et al., Ex. Gp.: 211

3,987,467, Re. S.N. 888,545, Filed Mar. 21, 1978, Cl. 354/105, PHOTOGRAPHIC FILM IDENTIFICATION SYSTEM, David W. Cowles, Owner of Record: *Inventor,* Attorney or Agent: Robert E. Geauque, Ex. Gp.: 211

3,993,964, Re. S.N. 878,187, Filed Feb. 14, 1978, Cl. 331/94.5 H, DOUBLE HETEROSTRUCTURE STRIPE GEOMETRY SEMICONDUCTOR LASER DEVICE, Hiroo Yonezu, Owner of Record: *Nippon Electric Company, Limited, Tokyo, Japan,* Attorney or Agent: John M. Calimafde, Ex. Gp.: 257

4,027,734, Re. S.N. 885,971, Filed Mar. 13, 1978, Cl. 175/9, DEVIATED CONDUCTOR DRIVING SYSTEM, Lajos (Louis) Horvath, Owner of Record: *Gurtler, Hebert & Company, Inc., New Orleans, La.,* Attorney or Agent: C. Emmett Pugh, et al., Ex. Gp.: 354

4,045,114, Re. S.N. 885,918, Filed Mar. 13, 1978, Cl. 339/210 M, METHOD OF MANUFACTURING AN ELECTRICAL CONNECTOR, Helen Dechelette, Owner of Record: *AMP Incorporated, Harrisburg, Pa.,* Attorney or Agent: William J. Keating, et al., Ex. Gp.: 325

PATENT NOTICES

Certificates of Correction for the Week of May 9, 1978

D. 244,080	4,041,189	4,059,453	4,067,105
3,603,249	4,041,403	4,059,454	4,067,210
3,644,623	4,041,527	4,059,587	4,067,318
3,692,907	4,041,789	4,059,714	4,067,531
3,741,971	4,042,453	4,059,781	4,067,561
3,764,628	4,043,723	4,060,117	4,067,696
3,824,139	4,044,837	4,060,283	4,067,997
3,884,336	4,046,165	4,060,384	4,068,022
3,905,202	4,046,613	4,060,606	4,068,071
3,905,216	4,047,653	4,061,346	4,068,536
3,929,051	4,047,823	4,061,721	4,068,644
3,930,026	4,047,856	4,062,439	4,068,727
3,931,283	4,049,620	4,062,462	4,068,742
3,952,012	4,049,623	4,062,495	4,068,773
3,960,927	4,049,690	4,062,746	4,068,816
3,966,747	4,049,812	4,062,829	4,068,842
3,971,264	4,049,824	4,062,846	4,068,912
3,980,089	4,049,826	4,062,909	4,068,953
3,981,135	4,049,943	4,063,319	4,069,076
3,998,823	4,051,056	4,063,444	4,069,119
3,998,870	4,051,248	4,063,484	4,069,179
4,000,281	4,051,542	4,063,527	4,069,184
4,001,225	4,053,023	4,063,772	4,069,191
4,008,263	4,053,460	4,063,952	4,069,227
4,010,271	4,054,568	4,063,958	4,069,241
4,013,590	4,054,989	4,064,071	4,069,490
4,013,665	4,055,270	4,064,205	4,069,559
4,013,891	4,055,655	4,064,457	4,069,595
4,014,943	4,055,774	4,064,505	4,069,742
4,018,219	4,056,046	4,064,511	4,069,755
4,019,342	4,056,569	4,064,748	4,070,005
4,019,971	4,057,049	4,065,070	4,070,015
4,020,966	4,057,144	4,065,108	4,070,109
4,021,826	4,057,388	4,065,190	4,070,110
4,024,472	4,057,613	4,065,235	4,070,914
4,026,247	4,057,635	4,065,278	4,071,119
4,026,254	4,057,696	4,065,355	4,071,209
4,031,079	4,057,832	4,065,513	4,071,269
4,031,811	4,058,039	4,065,761	4,071,401
4,032,585	4,058,046	4,065,960	4,073,079
4,034,764	4,058,166	4,065,977	4,073,341
4,035,192	4,058,507	4,066,083	4,073,452
4,035,729	4,058,665	4,066,123	4,073,643
4,036,156	4,058,856	4,066,133	4,073,768
4,036,237	4,059,131	4,066,231	4,074,477
4,037,608	4,059,239	4,066,317	4,074,762
4,038,295	4,059,247	4,066,685	
4,039,522	4,059,392	4,066,865	
4,041,144	4,059,432	4,066,898	

Adverse Decisions in Interferences

In the designated interferences involving the indicated claims of the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 3,318,976, G. A. Short, PRODUCTION OF MODIFIED POLYOLEFIN, Interference No. 99,637, decided Jan. 19, 1978, claims 1, 2 and 3.

Patent No. 3,384,050, M. A. R. Point, ELECTROSTATIC COATING SYSTEM, Interference No. 99,078, decided Jan. 12, 1978, claims 1, 2, 3 and 4.

Patent No. 3,551,831, G. S. Kino and P. N. Robson, TRAVELING-WAVE SOLID-STATE AMPLIFIER UTILIZING A SEMICONDUCTOR WITH NEGATIVE DIFFERENTIAL MOBILITY, Interference No. 98,548, decided Jan. 17, 1978, claim 14.

Patent No. 3,574,853, J. W. Barnhart, COMPOSITION AND METHOD OF REDUCING SERUM CHOLESTEROL WITH THIOBISCRESOLS, Interference No. 99,522, decided Jan. 24, 1978, claims 1–8.

Patent No. 3,670,489, W. J. Jackson, Jr. and M. T. Watson, TEXTILE YARN, Interference No. 98,601, decided Aug. 3, 1977, claims 1, 4 and 14.

Patent No. 3,717,384, J. L. Harned, ANTI-LOCK BRAKE CONTROL SYSTEM, Interference No. 98,985, decided Aug. 26, 1977, claims 1, 2 and 5.

Patent No. 3,726,887, G. Pohl, K. Rink and W. Triebel, PROCESS OF MAKING POLYESTERPOLYOLS, Interference No. 99,469, decided June 16, 1977, claims 1, 2, 4, 6, 7, 9, 10 and 11.

Patent No. 3,766,857, H. Schlatter, SADDLE LOCK-UP FOR FLEXIBLE PRINTING PLATES, Interference No. 98,919, decided Oct. 31, 1977, claims 1, 2 and 3.

Patent No. 3,780,711, A. W. Lindberg, ELECTRONIC FUEL INJECTION SYSTEM, Interference No. 99,261, decided Jan. 12, 1978, claim 1.

Patent No. 3,821,115, V. Lamberti, DETERGENT COMPOSITIONS CONTAINING SALTS OF 4-HYDROXY-ALKANOIC ACIDS, Interference No. 99,039, decided Dec. 13, 1977, claims 3 and 6.

Patent No. 3,837,524, J. R. Schubert and O. L. Brown, EASY OPENING CONTAINER WALL. Interference No. 99,014, decided Nov. 25, 1977, claims 1, 3, 4, 5, 6 and 7.

Patent No. 3,862,143, S. Klutchko, R. E. Brown, and M. Von Strandtmann, SUBSTITUTED CHROMONE-3-CARBONITRILES, CARBOXAMIDES AND CARBOXYLIC ACIDS, Interference No. 99,426, decided Jan. 18, 1978, claims 8, 16 and 17.

Patent No. 3,890,347, D. Middlemiss, ISOINDOLINE DERIVATIVES, Interference No. 99,465, decided Nov. 28, 1977, claim 48.

Patent No. 3,891,600, J. J. Maul and R. D. Carlson, HALOGEN CONTAINING FIRE RETARDANT ADDITIVE WITH IMPROVED HEAT STABILITY, Interference No. 99,185, decided Feb. 27, 1978, claims 1, 2, 4, 6, 8, 10, 11, 12, 13 and 14.

Patent No. 3,898,738, J. E. Linder, DENTAL INSTRUMENT, Interference No. 99,345, decided Dec. 22, 1977, claims 1–6.

Patent No. 3,907,642, W. Richmond, CHOLESTEROL OXIDASE AND METHOD OF EXTRACTING FROM NOCARDIA, Interference No. 99,466, decided Feb. 8, 1978, claims 1, 12 and 17.

Patent No. 3,915,665, H. S. Kalish, COATED CEMENTED CARBIDES FOR BRAZING, Interference No. 99,600, decided Dec. 13, 1977, claims 3 and 4.

Patent No. 3,962,330, G. Cotti, PROCESS FOR THE PREPARATION OF 6-DIMETHYL 1-6-DEOXY-6-METHYLENE- TETRACYCLINES, Interference No. 99,655, decided Jan. 25, 1978, claims 1, 2 and 4.

Patent No. 4,010,073, B. B. Drake, FREE-FLOWING ENZYME COMPOSITION, Interference No. 99,653, decided Feb. 10, 1978, claims 1–6.

Disclaimer

3,301,746.—*Lawrence H. Sanford,* Cincinnati and *James B. Sisson,* Hamilton, Ohio. PROCESS FOR FORMING ABSORBENT PAPER BY IMPRINTING A FABRIC KNUCKLE PATTERN THEREON PRIOR TO DRYING AND PAPER THEREOF. Patent dated Jan. 31, 1967. Disclaimer filed Mar. 10, 1978, by the assignee, *The Procter & Gamble Company.*

Hereby enters this disclaimer to claims 5, 6 and 7 of said patent.

National Technical Information Service

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Notice of Availability for Licensing

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Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator.

U.S. DEPARTMENT OF COMMERCE

National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161

Patent application 870,885. Smolder and Flame Resistant Insulation Materials, Composition and Method. Filed Jan. 18, 1978.

U.S. DEPARTMENT OF THE ARMY

Office of Judge Advocate General, Patent Division, Room 2C-455, Pentagon, Washington, D.C. 20314

Patent 4,000,419. Apparatus for Adding Electronic Display Information to a Night Vision Goggle Display. Filed Sept. 26, 1975. Patented Dec. 28, 1976. Not available NTIS.

Patent 4,001,554. Mode Control Computer Interface. Filed Oct. 29, 1975. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,001,604. Peak Value Detector. Filed Apr. 25, 1975. Patented Jan. 4, 1977. Not available NTIS.

Patent 4,001,961. Round Counter. Filed Sept. 3, 1975. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,282. Insulation of Microcircuit Interconnecting Wires. Filed Mar. 25, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,954. Trigger Circuit. Filed Dec. 11, 1975. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,969. Optimum Length Transmission Line Discriminator With Low Noise Detector. Filed Jan. 26, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,970. Optimum Threshold Transmission Line Discriminator. Filed Jan. 26, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,002,971. Wide Operating Frequency Range Transmission Line Discriminator. Filed Jan. 26, 1976. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,003,531. Reverse Flow Reaction Control System. Filed May 6, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,003,655. Hybrid Silicon Avalanche Quadrant Detector. Filed Apr. 17, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,004,212. Mine Detector System. Filed Dec. 20, 1972. Patented Jan. 13, 1977. Not available NTIS.

Patent 4,004,496. M16A1 Burst Control. Filed May 28, 1976. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,408. Multiple Electron Beam Analog to Digital Converter. Filed Oct. 8, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,006,206. Centrifugal Apparatus and Method for Processing Explosives. Filed Mar. 26, 1976. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,007,586. Soin Nozzle and Thrust Augmentor Mechanism. Filed Nov. 10, 1975. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,007,632. Apparatus for Determining the Textural Qualities of Food. Filed Jan. 29, 1976. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,008,170. Dry Water. Filed Nov. 28, 1975. Patented Feb. 15. 1977. Not available NTIS.

Patent 4,008,456. Tactile Target Alerting System. Filed June 30, 1975. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,008,537. Modification of Rifle Adapter Assembly to Prevent Doubling. Filed Oct. 3, 1975. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,008,966. Method and Apparatus for Beam Sampling by Acoustic Pulses. Filed Oct. 9, 1975. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,010,471. Polarization Rotator for Phase Array Antennas. Filed June 20, 1975. Patented Mar. 1, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE

AF/JACP, 1900 Half Street, SW., Washington, D.C. 20324

Patent 4,063,508. Munition Dispersion by Interstitial Propelling Charges. Filed Mar. 9, 1976. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,063,512. Armor Penetrating Projectile. Filed Oct. 5, 1966. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,063,819. High Energy Laser Pointing and Tracking System Utilizing Beam Angle/Focus Dither Method of Operation. Filed Aug. 27, 1976. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,064,327. Aluminum-Chlorine Thermal Battery. Filed Feb. 9, 1977. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,064,535. Method and Apparatus for Effecting Multiple Spectral Wavelength Imaging With Infrared Television. Filed July 19, 1976. Patented Dec. 20, 1977. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements & Patent Branch, General Services Division, Federal Building, Agricultural Research Service Hyattsville, Md. 20782

Patent application 725,224. Method of Producing Soybean Milk Yogurt. Filed Sept. 22, 1976.

Patent application 803,191. A Process for Recovering Proteinaceous Matter From Acid Whey and Tannery Unhairing Effluents. Filed June 3, 1977.

Patent application 866,079. Land Imprinter. Filed Dec. 30, 1977.

Patent 4,029,471. Process for Simultaneously Flameproofing and Shrinkproofing Wool. Filed Apr. 14, 1976. Patented June 14, 1977. Not available NTIS.

Patent 4,029,818. Process for Inhibiting the Deterioration of Wood Due to Marine Boring Organisms Via the Use of Dibutylbenzylphenol. Filed Apr. 9, 1976. Patented June 14, 1977. Not available NTIS.

Patent 4,031,265. Method of Reducing Bitterness in Citrus Juices. Filed June 18, 1975. Patented June 21, 1977. Not available NTIS.

Patent 4,063,888. Process for Preparing Space-Dyed Yarn. Filed Nov. 23, 1976. Patented Dec. 20, 1977. Not available NTIS.

Patent 4,064,683. Continuous Mechanized Harvesting of Horticultural Crops. Filed May 14, 1976. Patented Dec. 27, 1977. Not available NTIS.

Patent 4,069,106. Immobilization of Enzymes on Keratin. Filed Jan. 13, 1977. Patented Jan. 17, 1978. Not available NTIS.

U.S. DEPARTMENT OF ENERGY

Assistant General Counsel for Patents Washington, D.C. 20545

Patent application 680,605. Corrugated Cover Plate for Flat Plate Collector. Filed Apr. 26, 1976.

Patent application 701,480. Non-Tracking Solar Concentrator With a High Concentration Ratio. Filed June 30, 1976.

Patent application 734,838. Method for Reclaiming Waste Lubricating Oils. Filed Oct. 22, 1976.

Patent application 734,918. Pulse-Actuated Fuel-Injection Spark Plug. Filed Oct. 22, 1976.

Patent application 737,649. Spin Ejector. Filed Nov. 2, 1976.

Patent application 737,753. High Strength, High Ductility Low Carbon Steel. Filed 1977.

Patent application 740,330. Cryogenic Expansion Machine. Filed Nov. 9, 1976.

Patent application 740,338. Examination of Interior Surfaces Using Glow-Discharge Illumination. Filed Nov. 9, 1976.

Patent application 740,339. Process for Diffusing Metallic Coatings Into Ceramics to Improve Their Voltage Withstanding. Filed Nov. 9, 1976.

Patent application 744,472. Nose Tip Locking Device. Filed Nov. 24, 1976.

Patent application 744,494. Boron Nitride Insulating Material. Filed Nov. 24, 1976.

Patent application 749,206. Pipe Connector. Filed Dec. 9, 1976.

Patent application 750,317. Omega-X Micromachining System. Filed Dec. 14, 1976.

Patent application 751,622. Graphite Fiber Reinforced Structure for Supporting Machine Tools. Filed Dec. 17, 1976.

Patent application 751,623. Method for Preparing Metallated Filament-Wound Structures. Filed Dec. 17, 1976.

Patent application 760,305. Variable Orifice Using an Iris Shutter. Filed Jan. 18. 1977.

Patent application 761,037. Gas Scrubbing Liquids. Filed Jan. 21, 1977.

Patent application 763,167. Method of Sealing. Filed Jan. 27, 1977.

Patent 3,991,740. Sea Shell Solar Collector. Filed July 28, 1975. Patented Nov. 16, 1976. Not available NTIS.

Patent 4,016,237. Process for Separation of the Rare Earths by Solvent Extraction. Filed Sept. 8, 1975. Patented Apr. 5, 1977. Not available NTIS.

Patent 4,016,768. Traversing Probe System. Filed Mar. 15, 1976. Patented Apr. 12. 1977. Not available NTIS.

Patent 4,019,156. Active/Passive Mode-Locked Laser Oscillator. Filed Dec. 2, 1975. Patented Apr. 19, 1977. Not available NTIS.

Patent 4,019,157. Method and Apparatus for Tuning High Power Lasers. Filed Apr. 6, 1976. Patented Apr. 19, 1977. Not available NTIS.

Patent 4,020,003. Fixation of Tritium in a Highly Stable Polymer Form. Filed Feb. 24, 1976. Patented Apr. 26, 1977. Not available NTIS.

Patent 4,020,274. Superconducting Cable Cooling System by Helium Gas and a Mixture of Gas and Liquid Helium. Filed Jan. 27, 1976. Patented Apr. 26, 1977. Not available NTIS.

Patent 4,020,275. Superconducting Cable Cooling System by Helium Gas at Two Pressures. Filed Jan. 27, 1976. Patented Apr. 26, 1977. Not available NTIS.

Patent 4,024,217. Method of Isotope Separation by Chemi Ionization. Filed May 23, 1975. Patented May 17, 1977. Not available NTIS.

Patent 4,025,408. Deuterium Separation by Infrared-Induced Addition Reaction. Filed May 23, 1976. Patented May 24, 1977. Not available NTIS.

Patent 4,026,790. Removal of Zn or Cd and Cyanide From Cyanide Electroplating Wastes. Filed Mar. 7, 1975. Patented May 31, 1977. Not available NTIS.

Patent 4,028,096. Method of Melting Metals to Reduce Contamination From Crucibles. Filed May 13, 1976. Patented June 7, 1977. Not available NTIS.

Patent 4,028,154. Ammonium 2,4,5-Trinitroimidazole. Filed Sept. 1, 1976. Patented June 7, 1977. Not available NTIS.

Patent 4,029,558. Isotope Enrichment by Frequency-Tripled Temperature Tuned Neodymium Laser Photolysis of Formaldehyde. Filed Oct. 22, 1976. Patented June 14, 1977. Not available NTIS.

Patent 4,029,559. Ion Laser Isotope Enrichment by Photo Predissociation of Formaldehyde. Filed June 17, 1976. Patented June 14, 1977. Not available NTIS.

Patent 4,030,085. Nonferromagnetic Linear Variable Differential Transformer. Filed July 20, 1976. Patented June 14, 1977. Not available NTIS.

Patent 4,032,105. Mold With Improved Core for Metal Casting Operation. Filed Apr. 25, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,032,306. Isotope Separation by Photodissociation of Van der Waal's Molecules. Filed Mar. 8, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,038,369. Method for the Abatement of Hydrogen Chloride. Filed Nov. 14, 1975. Patented July 26, 1977. Not available NTIS.

Patent 4,038,622. Superconducting Dipole Electromagnet. Filed Apr. 13, 1976. Patented July 26, 1977. Not available NTIS.

Patent 4,040,802. Activation of Water Soluble Amines by Halogens for Trapping Methyl Radioactive Iodine From Air Streams. Filed Apr. 22, 1975. Patented Aug. 9, 1977. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Health, Chief, Patent Branch
Westwood Building, Bethesda, Md. 20014

Patent application 817,016. Blood Cell Separator. Filed July 19, 1977.

Patent application 840,231. Insolubilization of Microsomes. Filed Oct. 7, 1977.

Patent application 840,378. Transport Device for Invalids. Filed Oct. 7, 1977.

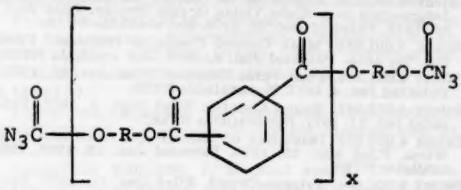
Patent 4,056,854. Aortic Heart Valve Catheter. Filed Sept. 28, 1976. Patented Nov. 8, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE INTERIOR
Branch of Patents, 18th and C Sts., NW.,
Washington, D.C. 20590

Patent application 816,058. System for Producing Orthophotographs. Filed July 15, 1977.

Erratum

T950,008. Winfred E. Weldy, Wilmington, Del. MODIFYING ARAMIDS.—In the notice of Defensive Publication appearing on pages 7 and 8 in the OFFICIAL GAZETTE of September 7, 1976, the hydroxyalkylphthalate aziodformate formula was misprinted. The correct formula is as follows:



PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF APRIL 22, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-3-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-16-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	5-25-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	6-13-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	2-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordinance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	11-19-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-27-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-7-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-26-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-7-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	3-9-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	6-13-77

Expiration of patents: The patents within the range of numbers indicated below expire during April 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,977,598 to 2,981,953, inclusive
Plant Patents..... Numbers 2,040 to 2,054, inclusive

REISSUE PATENTS

GRANTED MAY 9, 1978

ERRATA

For CLASS	See PATENT NO.
241–046.11	29,626

REISSUES

MAY 9, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,624
FLUID DISTRIBUTION APPARATUS

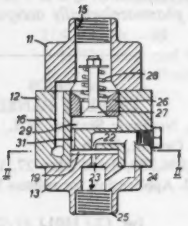
Ronald Rimmer, Cheltenham, England, assignor to Dowty Fuel Systems Limited, Cheltenham, England

Original No. 3,827,460, dated Aug. 6, 1974, Ser. No. 223,258, Feb. 3, 1972. Application for reissue Feb. 2, 1977, Ser. No. 765,008

Claims priority, application United Kingdom, Feb. 8, 1971, 4158/71

Int. Cl.² F15C *1/16*

U.S. Cl. 137—809 **3 Claims**



1. A fluid flow distribution apparatus having a main inlet, a plurality of devices each having a *circular* vortex chamber, a tangential primary inlet to each vortex chamber, [an] *a coaxial* outlet from each vortex chamber [coaxial therewith, a] *at least one* secondary inlet for each vortex chamber [offset from the central axis thereof] *in the peripheral portion thereof parallel or nearly parallel to the vortex chamber axis,* a primary manifold connecting the main inlet to all primary inlets, a secondary manifold connected to all secondary inlets, and a spring loaded check valve arranged to permit flow from the main inlet to the secondary manifold when pressure in the *main inlet exceeds pressure in the* secondary manifold [falls below pressure in the main inlet] by more than a predetermined amount.

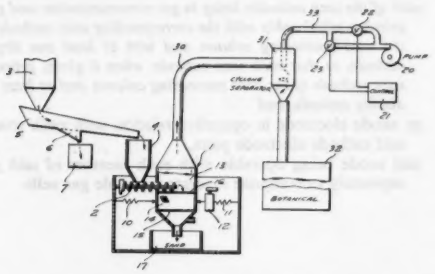
Re. 29,625
PROCESS AND APPARATUS FOR SEPARATING SAND FROM BOTANICAL MATERIALS

Thomas Wade Summers, Fern Creek, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Original No. 3,842,978, dated Oct. 22, 1974, Ser. No. 236,693, Mar. 21, 1972. Application for reissue Aug. 23, 1976, Ser. No. 716,392

Int. Cl.² B03B *4/08*

U.S. Cl. 209—469 **4 Claims**



1. An apparatus for the dry separation of sand particles from botanical fines in which substantially all of the sand particles and fines have a size which [is less than] *will be retained on* about *a* 100 mesh *screen* comprising

a. a substantially enclosed chamber;

b. supports means positioned at the bottom of said chamber for permitting the discharge of sand from said chamber, said support means including a plurality of substantially spherical bodies having a diameter of 2 to 5 mm and a tolerance of ±20 percent and constrained into substantially 3-center close packing;

c. first means for supplying a mixture of sand and botanical fines having a size [less than] *which will be retained on* about *a* 100 mesh *screen* into said chamber above said support means;

d. second means for moving an upwardly flow of gas through said support means into said chamber at a steady velocity sufficient to fluidize the mixture of sand and botanical fines above the support means; and

e. vibrating means for vibrating said support means.

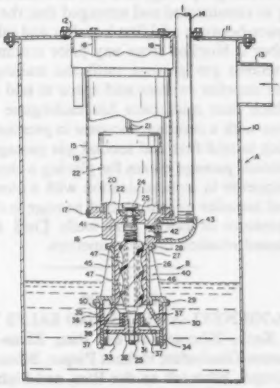
Re. 29,626
POSITIVE DISPLACEMENT ROTARY PUMP AND DRIVE COUPLING THEREFOR

Clifford H. Allen, 13109 Westchester Trail, Chesterland, Ohio 44026

Original No. 3,938,744, dated Feb. 17, 1976, Ser. No. 503,380, Sep. 5, 1974. Application for reissue Jan. 27, 1977, Ser. No. 763,063

Int. Cl.² B02C *18/40;* F01C *5/04;* F04C *15/00*

U.S. Cl. 241—46.11 **9 Claims**



3. In a progressing-cavity, positive displacement rotary pump assembly including a rotary shaft and drive means therefor, a generally tubular stator coaxial with said rotary shaft and having a helically formed interior surface, a *hollow tubular* rotor located within said stator and having a helically formed exterior surface engaging said interior surface of said stator to define therewith sealed pumping cavities, the improvement which comprises:

a *tubular* flexible member *surrounding said shaft whereby said shaft extends through said flexible member and said rotor,* for coupling said rotor to said shaft, one end of said member being rigidly connected to said shaft and the other end thereof being rigidly connected to said rotor to transmit driving torque to said rotor and to flex to accommodate orbital movement of said rotor during rotation thereof.

Re. 29,627

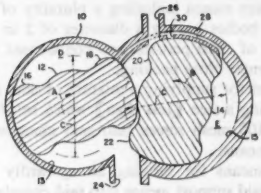
ROTARY COMPRESSOR

Roger C. Weatherston, Amherst, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Original No. 3,844,695, dated Oct. 29, 1974, Ser. No. 441,929, Feb. 12, 1974. Continuation of Ser. No. 297,576, Oct. 13, 1972, abandoned, and Ser. No. 76,519, Sep. 29, 1970, abandoned. Application for reissue May 10, 1976, Ser. No. 684,813

Int. Cl.[2] F01C *1/14, 1/18;* F04C *17/10, 23/00*

U.S. Cl. 418—9 18 Claims



1. A rotary expansible chamber apparatus, comprising:

A. a casing defining first and second working chambers,

B. a first gas passage communicating with each of said working chambers,

C. a second gas passage communicating directly with only said second working chamber,

D. a first impeller rotatably mounted in said first working chamber and having two lobes with the space therebetween defining two wells,

E. a second impeller rotatably mounted in said second working chamber and having two lobes in mating engagement within the wells of said first impeller, each lobe having a leading edge and a trailing edge,

F. said second gas passage and said first and second impellers being so constructed and arranged that the gas occupying the space between said first impeller and said first working chamber is blocked from any prior communication with said second gas passage until the trailing edge of said second impeller exposes said space to said second passage at which time said space has undergone a reduction in volume with a resultant increase in pressure between that existing in said first and second gas passage,

G. additional passage means for placing a closed well of said first impeller in communication with a closed well of said second impeller as said second passage is closed whereby the pressure of gas in said wells [in] *is* increased by continued rotation of said impellers.

Re. 29,628

AMINOBENZYL-AMINES AND SALTS THEREOF

Johannes Keck, Biberach an der Riss; Klaus-Reinhold Noll, Warthausen-Oberhofen; Helmut Pieper, Biberach an der Riss; Gerd Kruger, Biberach an der Riss, and Sigfrid Puschmann, Biberach an der Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

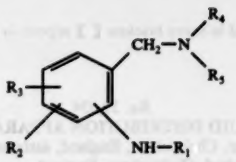
Original No. 3,950,393, dated Apr. 13, 1976, Ser. No. 458,099, Apr. 5, 1974. Application for reissue Dec. 2, 1976, Ser. No. 746,954

Claims priority, application Germany, Apr. 13, 1973, 2318636; Jan. 23, 1974, 2402989

Int. Cl.[2] C07C *101/68*

U.S. Cl. 560—37 5 Claims

4. A compound of the formula



wherein

R_1 is hydrogen, lower alkanoyl, benzoyl or halobenzoyl;

R_2 is chlorine or bromine;

R_3 is carboxyl or lower carbalkoxy; and

R_4 and R_5 are each hydrogen, alkyl of 1 to 5 carbon atoms, mono- or di-hydroxy(alkyl of 1 to 5 carbon atoms), alkenyl of 2 to 4 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, mono- or di-hydroxy(cycloalkyl of 5 to 7 carbon atoms) or benzyl;

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

Re. 29,629

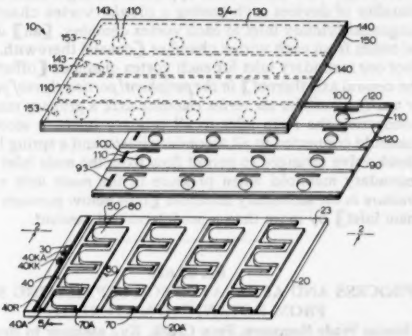
DISPLAY PANEL

James A. Ogle, Neshanic Station, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Original No. 3,886,389, dated May 27, 1975, Ser. No. 428,415, Dec. 26, 1973. Application for reissue May 23, 1977, Ser. No. 799,859

Int. Cl.[2] H01J *61/06*

U.S. Cl. 313—217 23 Claims



1. A display panel comprising

a gas-filled housing,

a plurality of *coplanar* electrode pairs supported on a surface in said housing and oriented in rows *and columns,*

said electrodes being operable as cathode electrodes *and each electrode pair including a scan cathode and a display cathode,* [and]

each of the scan cathodes being in gas communication and glow priming relationship with the corresponding scan cathodes of the next succeeding column and with at least one display cathode, so that each scan cathode, when it glows, primes a scan cathode of the next succeeding column and at least one display cathode, and

an anode electrode in operative relation with each row of said cathode electrode pairs,

said anode being operable with each member of said pair separately to comprise separate ionizable gas cells.

PLANT PATENTS

GRANTED MAY 9, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,250

STRAWBERRY PLANT

Harold A. Johnson, Jr., Watsonville, Calif., assignor to Driscoll Strawberry Associates, Inc., Watsonville, Calif.

Filed Apr. 15, 1977, Ser. No. 787,809

Int. Cl.[2] A01H *5/03*

U.S. Cl. Plt.—49 **1 Claim**

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

PATENTS

GRANTED MAY 9, 1978

ERRATA

For CLASS	See PATENT NO.
400–120	4,088,214
400–056	4,088,215
400–130	4,088,216
400–161.1	4,088,217
400–208	4,088,218
366–075	4,088,307
239–284 A	4,088,358
210–033	4,088,563
544–232	4,088,645
544–313	4,088,646
544–343	4,088,647
544–387	4,088,648
544–385	4,088,649
560–154	4,088,674
568–828	4,088,681
568–747	4,088,702
568–835	4,088,703
364–494	4,088,875
362–096	4,088,880
362–223	4,088,881
362–217	4,088,882
362–263	4,088,883
322–090	4,088,943
313–231.5	4,088,966
318–532	4,088,972
364–472	4,088,974
366–349	4,089,053

PATENTS

GRANTED MAY 9, 1978

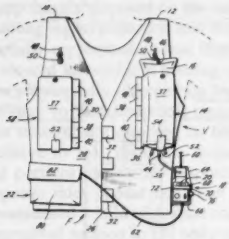
ERRATA

PATENTS

GRANTED MAY 9, 1978

GENERAL AND MECHANICAL

4,087,864
DISPENSING VEST FOR PATIENTS RECEIVING HYPERALIMENTATION
Larry D. LaBove, and Patrick A. Mann, both of Houston, Tex., assignors to Larry D. LaBove, Houston, Tex.
Filed Dec. 30, 1976, Ser. No. 755,976
Int. Cl.[2] A41D 1/04; A61M 5/00
U.S. Cl. 2—102 **9 Claims**



1. A vest for a patient receiving intravenous medication to permit the patient to move about while receiving the medication, comprising:

(a) a body attachment harness for mounting on the patient's upper body, said body harness having fastener means formed thereon;

(b) a medication pocket mounted with said harness adjacent said fastener means for receiving a bag having a suspending ring and containing intravenous hyperalimentation medication, which medication is to be intravenously furnished to the patient, said medication pocket comprising:

(1) a flap of material mounted along a side edge thereof, and extending outwardly from, said body harness;

(2) fastener means mounted with said flap at an end opposite said side edge to engage said fastener means of said body harness and thereby form said flap of material into a sleeve; and

(3) said sleeve being of a size to receive and retain therein the bag of intravenous hyperalimentation medication;

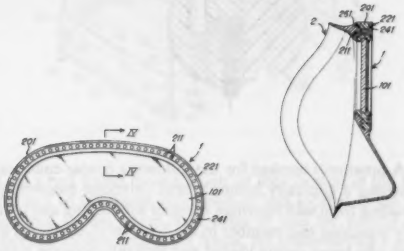
(c) a snap ring mounted with said body harness above said sleeve for attaching to the suspending ring of the bag of intravenous hyperalimentation medication to attach the bag to said body harness;

(d) a pump pocket mounted with said body harness for receiving a pump for transferring medication from the bag to the patient; and

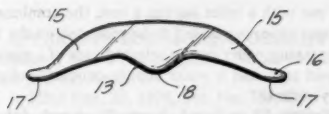
(e) a power supply pocket mounted with said harness for receiving a power supply to provide operating power to the pump in the pump pocket, permitting the patient to don the harness when the bag of medication, pump and power supply are placed in their respective pockets and to move about while receiving the intravenous medication.

4,087,865
DIVING MASK
Giovanni Garofalo, Rapallo, Italy, assignor to AMF Incorporated, White Plains, N.Y.
Filed Oct. 12, 1976, Ser. No. 731,232
Int. Cl.[2] A61F 9/02
U.S. Cl. 2—428 **3 Claims**

1. In a watertight face mask comprising a generally annular shaped resilient material face conforming member and a transparent sight panel member mounted in the front part of said face conforming member; an improved watertight seal structure between said two members, said improved seal structure comprising a plastic rim member surrounding the periphery of said sight panel member, said rim member having radially inner and outer and front and back circumferential extending surfaces, said rim member being thicker in its front to back dimension than the thickness of said sight panel member, said sight panel member being mounted to the radially inner circumferential surface of said rim member, a plurality of spaced holes formed in said rim member along the entire circumference thereof, said holes extending clear through said rim member through said front and back circumferential extending surfaces, a continuous circumferential extending groove formed in said front and back circumferential extending surfaces, said grooves being aligned with said holes whereby said holes open into said grooves, and integral portions of the front of said face conforming member being disposed in and filling said grooves and holes to provide a watertight seal between said rim and face conforming members.



4,087,866
INTRAOCULAR LENS
D. Peter Choyce, Westcliff-on-Sea, and Mohammed Jalie, London, both of England, assignors to Coburn Optical Industries, Inc., Muskogee, Okla.
Filed Apr. 26, 1977, Ser. No. 790,915
Int. Cl.[2] A61F 1/16, 1/24
U.S. Cl. 3—13 **3 Claims**



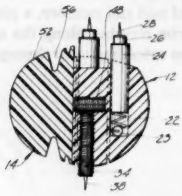
1. An intraocular lens for insertion in the anterior chamber of the eye comprising a lens portion having an anterior planar surface and a convex posterior surface, four extensions attached to said lens portion, said extensions being arranged in opposed pairs, each of said extensions consisting of a haptic which is bent away from the planar surface to the convex surface and a locating foot extending outwardly from the haptic and substantially parallel to the planar surface, the posterior surfaces of the feet lying in a plane which is posteriorly beyond the apex of the convex surface.

4,087,867

OPHTHALMIC PROSTHESIS IMPLANT

Horst R. Hickmann, Cincinnati, Ohio, and Roosevelt A. Albert, Auburn, Ala., assignors to Horst R. Hickmann, Cincinnati, Ohio

Filed Aug. 5, 1976, Ser. No. 711,884
Int. Cl.[2] A61F *1/16*
U.S. Cl. 3—13 **8 Claims**



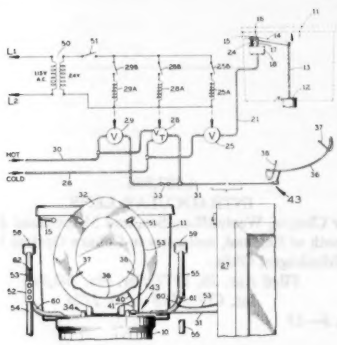
3. A prosthesis implant for use following ocular enucleation comprising a generally hemispherical cartridge member, pins protruding from said cartridge member for affixing and permanently attaching said member to the bony orbit, certain at least of said pins being spring loaded and shiftable between retractable and extended positions and being normally biased to their extended positions, and an eye prosthesis removably secured to said cartridge member.

4,087,868

SPRAY APPARATUS FOR TOILET

Paul Gentz, 2500 E. LasOlas Blvd., Ft. Lauderdale, Fla. 33301

Filed Jul. 28, 1976, Ser. No. 709,496
Int. Cl.[2] A47K *3/22*
U.S. Cl. 4—7 **23 Claims**



1. For use with a toilet having a seat, the combination of:

water spray means adapted to be mounted on the toilet seat for spraying water onto a selected area of a person sitting on said seat, and a water supply conduit leading to said spray means;

first electrically-operated, normally-closed valve means having a hot water inlet and a hot water outlet which is connected to said water supply conduit, means for limiting the pressure of the water supplied to said conduit by said first valve means to a value insufficient to produce an effective spray discharge at said spray means;

second electrically-operated, normally-closed valve means having an outlet which is connected to said supply conduit for supplying warm water to the latter at a pressure high enough to produce an effective spray discharge at said spray means;

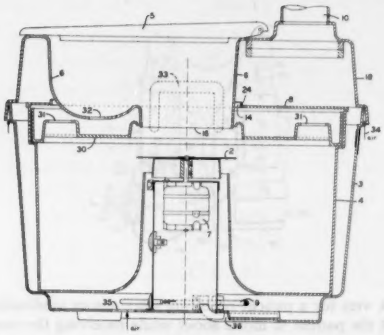
and switch means operatively connected to said first and second valve means to open them separately for supplying water to said supply conduit.

4,087,869

TOILET IN WHICH SOLID WASTES ARE COLLECTED AND DECOMPOSED

Enok Gerhard Billsund, Hyltebruk, Sweden

Continuation-in-part of Ser. No. 531,790, Dec. 11, 1974, abandoned. This application Oct. 18, 1976, Ser. No. 733,078
Int. Cl.[2] A47K *11/02*; C05F *3/06*
U.S. Cl. 4—111 **8 Claims**



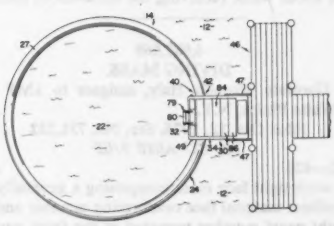
1. A toilet arrangement, especially for collecting waste products, and comprising: an outer casing having a ring-like seat on the top, a compost container in the casing beneath the seat, an opening in the top of the compost container, a bowl element beneath said seat and having an opening in the bottom aligned with the opening in the top of the compost container, a urine container mounted on said compost container and disposed between the compost container and the bowl element, the bowl element having a draining hole for draining urine from the bowl element to the urine container, a rotatable member disposed in the upper part of said compost container beneath the opening therein comprising a disc-like element disposed substantially horizontally and beneath the opening in the bottom of the bowl element and rotatable on a vertical axis, the disc-like element obstructing visibility of the inside of the compost container through the seat, and drive means connected to said member for driving the member in rotation thereby to distribute waste material supplied to said member through said seat in said compost container.

4,087,870

FLOATING POOL ASSEMBLY

John M. Palmer, Jr., 1420 Julie Lagoon, Lutz, Fla. 33549

Filed Jul. 30, 1976, Ser. No. 710,149
Int. Cl.[2] A47K *3/00*; E04H *3/16, 3/18*
U.S. Cl. 4—171 **13 Claims**



1. A pool assembly of the type primarily designed to be floatingly supported in a body of water, said pool assembly

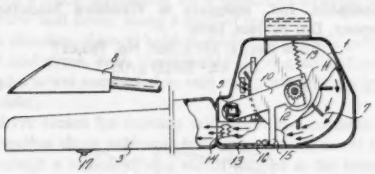
comprising: liner means dimensioned and configured to define a liquid container disposed in substantially segregated relation from the body of water, said liner means comprising a base portion and side wall means both formed from a flexible sheet element, said liner means further including floatation means secured to said side wall means along the length of said side wall means, said floatation means formed from a buoyant material, said floatation means disposed to substantially define at least a portion of the peripheral boundary of said liner means and positioned in supporting relation to the remainder of said liner means at least in part on the surface of the body of water; deck means comprising a housing formed in part from buoyant material and supportingly disposed on the surface of the body of water, connecting means formed in said housing and configured to substantially correspond to said floatation means and be removably secured thereto; said housing comprising a first housing portion substantially disposed on the interior of said liner means relative to said floatation means, and a second housing portion substantially disposed on the exterior of said liner means relative to said floatation means, said first and second housing portions operatively disposed relative to one another on opposite sides of said floatation means, whereby water may be maintained within said liquid container for swimming and in segregated relation to the body of water in which said pool assembly is supported.

4,087,871

VENTILATED TOILET

Johannes Benthin, Bremerhaven, Germany, assignor to MFB Neuwerk Mechanische Fensterbehaenge GmbH, Bremerhaven, Germany

Filed Mar. 8, 1976, Ser. No. 664,805
Claims priority, application Germany, Mar. 7, 1975, 2509946
Int. Cl.[2] E03D *9/05*; A47K *13/30*
U.S. Cl. 4—217 **19 Claims**



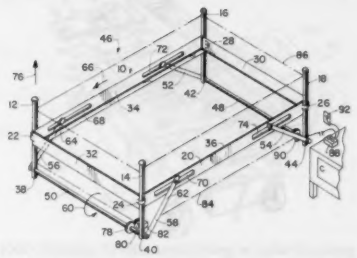
1. A ventilated toilet, comprising in combination a toilet bowl bounding a space; and blower means comprising a support, a housing having an inlet port and an outlet port, an impeller mounted in said housing for rotation about a stationary axis, means mounting said housing in said support pivotably about said stationary axis for movement in a circumferential direction of said impeller for a relatively small angular distance between one circumferential position in which said inlet port of said housing communicates with said space of said toilet bowl and said outlet port of said housing communicates with the environment of said blower means, and another position in which said outlet port of said housing communicates with said space of said toilet bowl and the inlet port of said housing communicates with the environment of the blower means, said impeller aspirating air from said space of said toilet bowl when said housing is in said one position and said impeller directing air into said space when said housing is in said other position.

4,087,872

MOVABLE BED FRAME

James M. Smirle, 309 Windsor Rd., Woodridge, N.J. 07075

Filed Jan. 28, 1977, Ser. No. 763,352
Int. Cl.[2] A47C *3/32*
U.S. Cl. 5—63 **6 Claims**



1. In a bed frame having a pair of legs located at the headboard end of the frame and a pair of legs located at the footboard end of the frame, said pairs of legs for resting on a supporting surface below the frame, the frame having a generally rectangular shape including a pair of opposed elongated side members attached to a headboard end member and a footboard end member, the improvement comprising:

means to slidably attach said pairs of legs to said frame,

a first pair of arms, one end of each of said first pair of arms pivotably secured to said headboard pair of legs, a first shaft fixedly secured to the ends thereof to said one end of said each of said first pair of arms, the other end of one of said first pair of arms slideably engaged within a first slot located in one of said pair of elongated side members, said first slot extending along the longitudinal axis of said one side member, first means to rotate said first shaft causing said first pair of arms to alter the angular relationship between said first pair of arms and said headboard pair of legs and causing said other end of said one of said first pair of arms to travel along the length of said first slot, and

a second pair of arms, one end of each of said second pair of arms pivotably secured to said footboard pair of legs, a second shaft fixedly secured at the ends thereof to said one end of said each of said second pair of arms, the other end of one of said second pair of arms slideably engaged within a second slot located in said one side member, said second slot extending along the longitudinal axis of said one side member, second means to rotate said second shaft causing said second pair of arms to alter the angular relationship between said second pair of arms and said footboard pair of legs and causing said other end of said one of said second pair of arms to travel along the length of said second slot.

4,087,873

APPARATUS FOR MOVING OBJECTS

Hiroshi Ohkawa, 3-13-8 Minamigaoka, Nishin-cho, Aichi-gun, Aichi-ken 470-01, Japan

Filed Dec. 23, 1976, Ser. No. 753,636
Claims priority, application Japan, Dec. 27, 1975, 50-158315
Int. Cl.[2] A61G *7/08*; F16H *7/18*
U.S. Cl. 5—81 B **8 Claims**

1. An apparatus for moving an object, comprising:

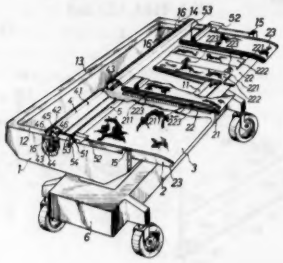
an endless conveyor belt for carrying an object and rotatably mounted about a generally flat, substantially horizontal support plate;

a base under said plate supporting the plate for horizontal rectilinear movements away from the base and return to initial overlying position;

driving means connected to said plate for moving the plate in said horizontal rectilinear movements; and

fastening means for selectively clamping and unclamping the

upper run of said conveyor belt to and from said base so that when the fastening means is clamped the conveyor belt is caused to rotate about the plate in one direction when the plate is driven away from the base and in the



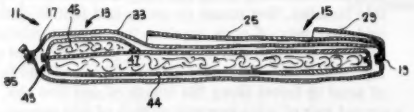
opposite direction when the plate is driven toward the base, said conveyor belt being rotated solely by movements of the plate and being stantionery with respect to the plate when the fastening means is unclamped.

4,087,874

INFANT CARRIER BAG WITH MOVABLE FILLER BENEATH PILLOW

Lee Weller Callaway, and Michael Arthur Callaway, both of 1746 View Dr., Milpitas, Calif. 95035

Filed Feb. 18, 1977, Ser. No. 770,088
Int. Cl.[2] B32B *3/20*; A47G *9/00*
U.S. Cl. 5—343 **3 Claims**



1. An infant carrier bag comprising,

a closed inner bag having a lower support section containing a movable filler extending in length beyond the head to toe length of an infant to be carried and a closed pillow section disposed in elevation above said lower support section at a head region thereof

an outer bag completely lining the exterior of said inner bag and a first quilt attached to said outer bag above said outer bag opposite said head region, at a toe region so that an infant may be placed between said first quilt and said outer bag, said first quilt being connected to said outer bag along a first side thereof from a distal tip of said toe region toward said head region, said first quilt including a closure along a portion of a second side thereof, opposite said first side, opening said first quilt with respect to the outer bag, and

a second quilt connected to said first quilt at said toe region and extending above a portion of said first quilt from said toe region a distance less than half the length of said first quilt in the direction of said head region, forming a quilt strip.

4,087,875

APPARATUS FOR FORMING AND THREADING STOCK

Dean Lacy, 40375 Grand River, Novi, Mich. 48050

Filed Jan. 10, 1977, Ser. No. 758,308
Int. Cl.[2] B21K *1/44*; B23G *11/00*
U.S. Cl. 10—11 R **13 Claims**

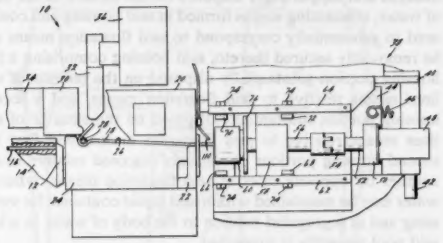
1. Apparatus adapted for use with a four slide machine for enabling said four slide machine to thread at least one end portion of a workpiece while another portion of said workpiece is being shaped, said apparatus comprising:

a thread rolling head;

driving means connected to said thread rolling head and adapted to continuously rotate said thread rolling head;

means for reciprocating said thread rolling head and said driving means with respect to said four slide machine so as to cause said thread rolling head to engage an end portion of said workpiece, said reciprocating means being movably secured to said four slide machine;

a first sliding member movably supported upon said reciprocating means, said driving means and said thread rolling



head being fixedly secured to said sliding member and movable in a direction parallel to the direction of movement of said reciprocating means so as to allow movement of said thread rolling head subsequent to engagement with said workpiece while said reciprocating means remains stationary;

first stop means adapted to close said thread rolling head upon its withdrawal from said workpiece;

second stop means adapted to open said thread rolling head once said workpiece has been threaded; and

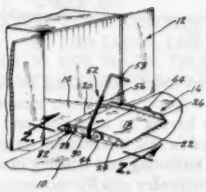
means securing said first and second stop means to said four slide machine.

4,087,876

PORTABLE DOCK PLATE

Russell L. Fillman, Mitchellville, Iowa, and Young Z. Yoon, Indianapolis, Ind., assignors to Woodford Manufacturing Company, Des Moines, Iowa

Filed Apr. 1, 1977, Ser. No. 783,617
Int. Cl.[2] E01D *1/00*
U.S. Cl. 14—72.5 **9 Claims**



1. A portable dock plate, comprising,

a ramp having forward and rearward ends, and two sides, a wheel assembly having wheel means pivotally secured to the sides of said ramp and an axle means therebetween operationally connecting said wheel means of said sides,

handle means secured to said wheel assembly and adapted to move said wheel assembly to a portable position in portable support of said ramp, and to a retracted nonportable position,

said handle means being one handle secured to said wheel assembly at one side of said ramp, and extending upwardly and rearwardly when said wheel assembly is in its portable

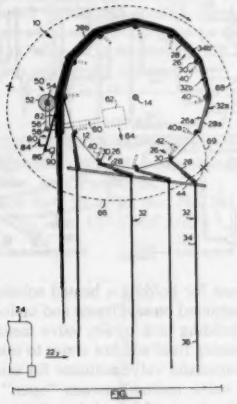
position, said handle means terminating in a horizontal portion centrally positioned rearwardly of said ramp when said wheel assembly is in its portable position.

4,087,877

DRUM TOWEL DRIER FOR VEHICLES

Ivan J. Barber, Clarkson, Canada, assignor to The Allen Group Inc., Melville, N.Y.

Filed Mar. 25, 1977, Ser. No. 781,321
Claims priority, application Canada, Dec. 29, 1976, 268803
Int. Cl.[2] B60S 3/06
U.S. Cl. 15—97 B 15 Claims



1. A drum towel drier for drying vehicles, comprising in combination:

(a) a drum having a central axis,

(b) a frame,

(c) means mounting said drum on said frame with said axis horizontal, for rotation of said drum about said axis and with a space therebelow for a vehicle to be dried to pass below said drum, along a path of travel,

(d) a plurality of towel holders spaced around the periphery of said drum, each towel holder having an end portion, and a towel connected to said end portion of each towel holder,

(e) drive means for rotating said drum in a predetermined direction about said axis, for carrying each towel holder through a vehicle drying sector located at the bottom of said drum and a return sector,

(f) means mounting each towel holder for movement of said end portion thereof between a first position and a second position, said second position being displaced from said first position such that a towel attached to a said end portion and extending around said drum in a direction opposite to said predetermined direction is pulled around said drum in said predetermined direction when said end portion is moved from said first to said second position,

(g) means for moving said end portion of each towel holder to said first position as such towel holder is carried through said return sector,

(h) cooperating trip means on said frame and on each towel holder for moving each end portion from said first to said second position as the towel holder thereof is carried from said return sector into said vehicle drying sector, whereby to facilitate unwrapping of said towels from said drum,

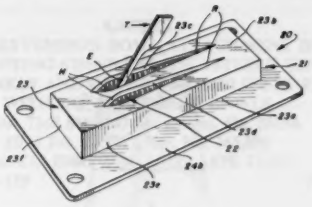
(i) and drying means located in said return sector for removing water from said towels.

4,087,878

TOOL CLEANING DEVICE

Herman R. Grieshaber, 621 Exmoor Rd., Kenilworth, Ill. 60043, and Jack E. Wilkinson, 544 Fresno St., Fresno, Calif. 93706

Filed Mar. 12, 1976, Ser. No. 666,326
Int. Cl.[2] A46B 17/06
U.S. Cl. 15—111 4 Claims



1. A tool cleaning device comprising a hollow casing having a generally planar, substantially inflexible exterior surface portion provided with an elongated slot having an enlarged first end into which a soiled segment of the tool is adapted to be inserted, and a narrow end from which the inserted segment of tool is adapted to be withdrawn subsequent to being cleaned, the ends of the slot being interconnected by elongated substantially inflexible sides converging from the enlarged end to the narrow end so as to provide a tapered configuration to said narrow end, and an elongated setose member disposed in a substantially fixed position within said casing and having elongated resilient setae thereof disposed with their axes substantially normal to the generally planar exterior surface portion of said casing, said setae having the free ends thereof adjacent said slot and adapted to frictionally tangentially engage and clean opposing side surfaces of the inserted tool segment upon relative movement of the latter longitudinally of the slot and the narrow end thereof adapted to effect cleaning along the sides of said tool upon withdrawal thereof from said slot.

4,087,879

SHAG RUG BRUSHING AND OBJECT RETRIEVING DEVICE

Forrest Spence, 300 N. Rampart, Space 145, Orange, Calif. 92668

Filed Jan. 10, 1975, Ser. No. 540,135
Int. Cl.[2] A47L 11/40, 13/40
U.S. Cl. 15—142 1 Claim

1. A shag rug brushing and ferrous metal retrieving element that includes:

a. an elongate strip;

b. means on the ends of said strip that define a pair or longitudinally spaced and longitudinally aligned openings;

c. a plurality of longitudinally spaced prongs that extend outwardly from said strip; and

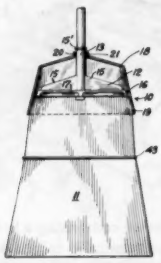
d. a plurality of permanent magnets, with each of said magnets mounted in a free end of one of said prongs.

4,087,880

BROOM

Franklin T. Clark, Jr., Girard, Pa., assignor to Tantera, Inc., Girard, Pa.

Filed Dec. 24, 1975, Ser. No. 644,073
Int. Cl.[2] A46B 3/04
U.S. Cl. 15—175 **2 Claims**



1. In combination, a broom comprising a base member integrally molded of plastic material,

said base member having on the lower end thereof an elongated generally rectangular flange portion extending in a direction transverse to the central exis of said base,

said elongated flange portion including a downwardly-directed circumferential flange portion extending around said elongated flange portion to provide a bristle-receiving opening therein,

said elongated flange portion having an internally-threaded broomstick receiving hollow boss integrally formed on the upper surface thereof and perpendicular thereto,

two plate-like web members, each web member extending laterally outwardly from each side portion of said hollow boss and terminating adjacent the outer ends of said elongated flange portion, each of said web members being integrally formed to said boss and to said elongated flange portion,

a plurality of bristles arranged in a tightly held bundle and having bristle ends disposed within said bristle-receiving opening, said plastic material of said elongated flange and said circumferential flange intruding between said bristle ends to provide a bond therebetween,

a cover member being substantially U-shaped in cross-section and having a depending skirt portion engaging said downwardly directed circumferentially flange portion,

said cover having a hollow boss extending upwardly from the upper surface thereof for internally receiving said boss of said base member,

said boss of said base member having an annular flange element at the upper end thereof, and

said boss of said cover having an upwardly-directed annular flange element adpated to snap under said annular flange of said boss of said base member for holding said cover over said base and over the ends of said bristles.

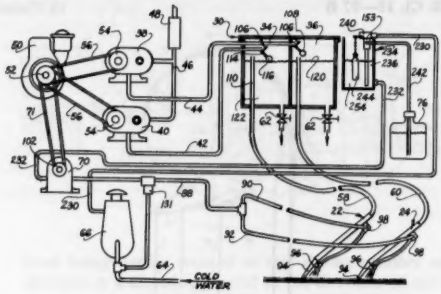
4,087,881

CARPET CLEANING MACHINE

Jack A. Bates, 2530 Fishinger, Columbus, Ohio 43221

Filed Mar. 9, 1976, Ser. No. 665,269
Int. Cl.[2] A47L 9/00
U.S. Cl. 15—300 A **8 Claims**

1. A carpet cleaning machine comprising, in combination, a frame; a dirty fluid collecting means mounted on said frame and including first and second collecting chambers, each of said chambers including a collecting chamber inlet and a collecting chamber outlet; a cleaning fluid reservoir mounted on said frame and including a reservoir outlet; first and second vacuum pumps mounted on said frame, each of said pumps including a pump inlet connected to a respective one of said collecting chamber outlets; water heater means mounted on said frame and including a cold water inlet and a hot water outlet; first and second manually manipulatable carpet cleaning tools, each of said tools including a tool outlet for dispensing a mixture of water and cleaning fluid on a carpet and a tool inlet for collecting dirty fluid from the carpet; first and second flexible dirty fluid conduits, each of said conduits connecting a respective one of said tool inlets with a respective dirty fluid collecting chamber; first and second vacuum cut-off means for terminating the suction at a respective tool inlet, each of said cut-off means being associated with a respective dirty fluid collecting chamber, said vacuum cut-off means being automatically operative responsive to dirty fluid rising to a predetermined fluid level in a respective dirty fluid collecting chamber;



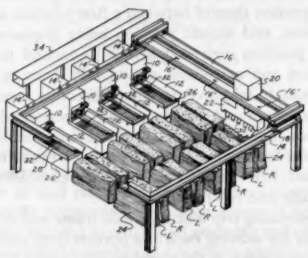
holding tank means for holding a heated solution of cleaning fluid and water mounted on said frame and including a holding tank inlet and a holding tank outlet; valve means for controlling a flow of cleaning fluid and hot water to said holding tank means inlet; an automatic valve actuator for said valve means for shifting said valve means between "open" and "closed" positions responsive to the rising of the solution to a predetermined level in said holding tank means; pump means including a pump inlet communicating with said holding tank outlet and a pump outlet; first and second flexible cleaning fluid conduits, each of said conduits connecting a respective one of said tool outlets with said outlet of said pump means; and power means mounted on said frame for driving said pump means and blower means.

4,087,882

APPARATUS FOR PLUCKING AND DELIVERING FIBER TO A FEEDER WITH AUTOMATIC DUST CONTROL

Alex J. Keller, Gastonia, N.C., assignor to Automatic Material Handling, Inc., Bessemer City, N.C.

Filed Jan. 12, 1977, Ser. No. 758,590
Int. Cl.[2] A47L 5/00
U.S. Cl. 15—301 **9 Claims**



9. Apparatus for delivering fiber to a feeder unit with a minimum propagation of fiber dust, said apparatus including:

(a) feeder means for receiving fibers;

(b) a pick-up head including means for selectively engaging

and releasing increments of fiber, said pick-up head being arranged on carriage means for permitting movement of said pick-up head;

(c) control means responsive to generated control signals for causing said pick-up head to move through a predetermined cycle which includes delivering said increments of fiber to a position above said feeder means and dropping said increments of fiber into said feeder means;

(d) a conduit disposed at said feeder means adjacent the path of travel of said increments of fiber dropped from said pick-up head into said feeder means, said conduit having an opening therein;

(e) a vacuum source; and

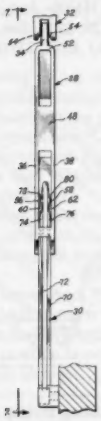
(f) vacuum control means responsive to selected ones of said control signals to cause said vacuum source to be connected to said conduit during said dropping of said increments of fiber into said feeder whereby a vacuum is caused to be imposed within said conduit during said dropping, and to cause said vacuum source to be disconnected from said conduit after said increments of fiber have been dropped into said feeder means.

4,087,883

DOOR SUPPORT

Dagfinn O. Amdal, Rockford, Ill., assignor to Keystone Consolidated Industries, Inc., Peoria, Ill.

Filed Nov. 15, 1976, Ser. No. 741,959
Int. Cl.² E05F *5/02*
U.S. Cl. 16—82 **8 Claims**



1. A door support bracket construction to maintain a door hung about a horizontal axis on a frame in an open position comprising, in combination:

a bracket member comprised of an elastic material, said bracket member including opposed, spaced sides, said bracket member also including a guide plate connecting the sides and maintaining the sides in a substantially constant spaced relation; and

a slide member telescoped at one end into an end of the bracket member between the sides, the opposite end of each member including means for pivotally attaching that member to the frame or door;

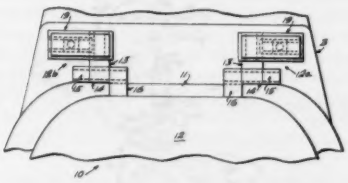
the inside surface of said bracket sides and the outside surface of the slide member including opposed cam surfaces inclined toward each other to define a single position of maximum interference which elastically separates the sides upon sliding movement of the slide member relative to the bracket member at a position slightly less than full extension of the slide member in the bracket member, said inside surface of the bracket member and the outside surface of the slide member also including separate opposed locking barbs which engage at full extension of the slide member in the bracket member to limit further telescoping action, said sides being normally separated at full extension whereby the opposed cam surfaces engage and prevent said slide member from telescoping into the bracket member until sufficient force is provided to elastically separate the bracket sides.

4,087,884

LATERAL EXTENSION BOWL ATTACHMENT DEVICE FOR ADAPTING STANDARD RELATIVELY HINGED TOILET SEAT AND COVER ASSEMBLIES FOR USE WITH NON-STANDARD BOWLS

Abe Seiderman, 7365 SW. 132 St., Miami, Fla. 33156

Filed Feb. 3, 1977, Ser. No. 765,083
Int. Cl.² E05D *7/04, 11/00;* A47K *13/12*
U.S. Cl. 16—129 **7 Claims**



1. A clamping device for adapting standard, relatively-hinged toilet seat and cover assemblies for use with non-standard bowls, said assemblies having flat, spaced, parallel, rectangularly-shaped bowl securements hinge leaf portions for seating flat against the top surface of the toilet bowl at the rear of the bowl opening, comprising, in combination, an elongated rectangular clamp bar member having a flat undersurface, a transverse, rectangular recess in the underside of said clamp bar member near one end thereof, said clamp bar recess being of such rectangular shape as to embracingly receive said hinge leaf portion from underneath, a longitudinally-extending, central recess in said underside of said clamp bar member open to the other end thereof and terminating short of said one end thereof, said longitudinally-extending recess being of uniform cross-sectional shape and internally undercut to provide an internally-recessed portion of increased transverse size, and a threaded bolt having a head portion at one end received in said internally-recessed portion of increased size so as to be constrained to longitudinal movement therein and therealong, and a shank portion extending outwardly of said longitudinally-extending portion, said underside of said clamp bar member being provided at said other end thereof with a transversely-extending projection serving as a fulcrum in the clamping attachment of the clamp bar member to a toilet bowl.

4,087,885

ADJUSTABLE HINGE

Donald O. Gillentine, Dansville, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Jul. 5, 1977, Ser. No. 813,197
Int. Cl.² E05D *11/00;* A47C *1/00;* B60N *1/02*
U.S. Cl. 16—146 **6 Claims**

1. An adjustable hinge comprising:

a first arm;

a pivot pin rigidly secured to said first arm to extend to at least one side thereof along an axis;

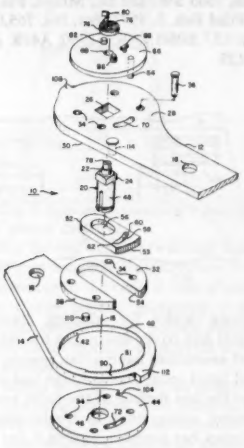
a bearing element extending from the other side of said arm and having a first bearing surface lying at least partially within a cylindrical surface which is coaxially aligned with said pivot pin;

a second arm having an opening therethrough which is at least partially defined by a second bearing surface generally matching said first bearing surface, said bearing element being received within said opening to mount said

second arm for rotation relative to said first arm about said axis, said second arm including an arcuate toothed rack coaxially aligned with said second bearing surface;

an arm retention plate fixedly mounted relative to said bearing element to overlie said second arm for retention of said second arm on said bearing element;

a toothed locking pawl mounted relative to said first arm in general alignment with said arcuate rack for radial movement with respect to said axis for selectively engaging with and disengaging from said arcuate rack, said pawl having an arcuate slot therethrough which includes a first end which is closer to said pivot pin than a second end thereof;



a pawl actuating device pivotally mounted on said pivot pin and including a pawl locating pin displaced a predetermined distance from and extending in a direction parallel with said axis to be commonly received within said arcuate slot of said pawl and matching, aligned slots through said first arm and said retention plate; and

each of said aligned slots having an arcuate shape with an effective radius from said axis equal to said predetermined distance, said first arm and said retention plate supporting said locating pin at said aligned slots therethrough at both sides of said pawl to distribute operating forces acting along said locating pin during movement of said pawl thereby.

4,087,886

AUTOMATIC EVISCERATION PROCESS FOR ANIMAL CARCASSES

Georges Aubert, La Chapelle de Guinchay, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Jun. 4, 1976, Ser. No. 692,662

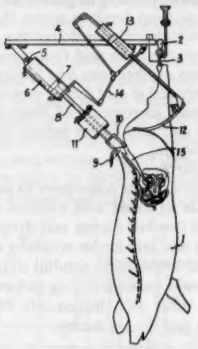
Claims priority, application France, Jun. 10, 1975, 75 18025

Int. Cl.[2] A22B *5/00*

U.S. Cl. 17—52 **3 Claims**

1. Automatic evisceration process of animal carcasses for human consumption suspended from a conveyor chain and continuously moved along a track, comprising the steps of:

positioning a rotary cutting tool in relation to the animal's anus, rotating said tool and advancing the tool to penetrate the area around the animal's anus by a pre-determined length, withdrawing said tool from the animal's anus, positioning a longitudinal sectioning device in relation to the animal's anus, and causing said device to penetrate the animal's anus by a predetermined length, severing the animal's coxal bone with said device without perforating its intestines and bladder, withdrawing said device, pivoting the carcass suspended from the conveyor chain by 90° approximately, guiding the carcass to incline it to bring its ventral side onto a cutting means and then



onto successive cutting elements to successively open the carcass in order to free and remove successively in separate manner the abdominal and then the thoracic viscera.

4,087,887

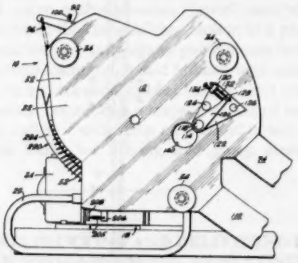
SHRIMP PROCESSING DEVICE AND METHOD

Paul H. Hoffman, 18003 NW. 78 Ave., Hialeah, Fla. 33015, and John A. Lessig, 4140 Hardie Ave., Miami, Fla. 33133

Filed Sep. 29, 1976, Ser. No. 727,647

Int. Cl.[2] A22C *25/08, 29/02*

U.S. Cl. 17—73 **32 Claims**



1. A device for processing shrimp and like arthropoda comprising a housing, a tunnel opening through said housing including a main portion and outwardly opening infeed and discharge end portions, interconnected by said main portion;

means to ventrally impale shrimp fed into said infeed portion of said tunnel and to transport them through said main tunnel portion and discharge end portion;

means to orient shrimp fed into said infeed portion of said tunnel in predetermined attitude during advance of said shrimp therethrough precedent to ventral impalement on said transport means;

operating means positioned relative to the path of advance of ventrally impaled shrimp through said main tunnel portion to longitudinally sever the abdominal membrane of each ventrally impaled shrimp to loosen the front shell sections thereof, to strip the swimmerettes therefrom and to longitudinally slit the dorsal side of the shrimp meat to expose the mid-gut vein as said ventrally impaled shrimp are advanced by said transport means through said main tunnel portion;

air flow inducing vacuum means opening into said main tunnel portion to pneumatically advance the shrimp fed into said infeed portion therethrough into ventrally im-

paled engagement with said transport means and to pneumatically displace the swimmerettes, front shell sections and mid-gut vein from each impaled shrimp meat being transported through said main tunnel portion and to discharge such debris from the device.

4,087,888

METHOD AND APPARATUS FOR REMOVING WASTE SETTLING UNDER CARDING MACHINE OR THE LIKE

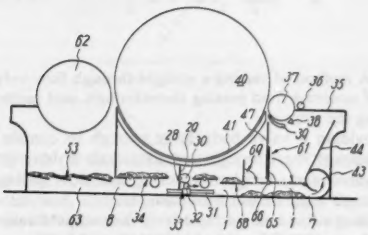
Toyozo Tanaka, Takada, Japan, assignor to Unitika Limited, Japan

Filed Jun. 27, 1975, Ser. No. 591,053

Claims priority, application Japan, Jun. 29, 1974, 49/74808; Jul. 1, 1974, 49/75116; Jul. 1, 1974, 49/75118; Dec. 16, 1974, 49/144264; Dec. 16, 1974, 49/144265; Feb. 28, 1975, 50/25494; Feb. 28, 1975, 50/25495

Int. Cl.[2] D01G *15/82*

U.S. Cl. 19—107 11 Claims



1. Apparatus for removing waste from under a carding machine installed on a supporting surface, said machine including a taker-in roller, a cylinder having a casing, and a doffer, wherein the improvement comprises:

shutter means placed above said supporting surface in a region at least below said taker-in roller, said shutter means comprising a cover sheet;

suction means for removing waste from below said shutter means, said suction means including an air channel and said shutter means forming the top of said air channel in said region; and,

means for retracting said cover sheet from said air channel to an open position in which waste is permitted to fall into said air channel and for drawing said cover sheet over said air channel to a closed position in which the shutter means forms the top of said air channel.

4,087,889

WIRE CONNECTING SLEEVE

Shintaro Ohba; Nobuhiko Hirose; Nobuhiro Sugihara, and Takayuki Aikawa, all of Tokyo, Japan, assignors to Kabushiki Kaisha Saneisha Seisakusho, Japan

Filed Jul. 15, 1976, Ser. No. 705,572

Claims priority, application Japan, Jul. 18, 1975, 50-99061

Int. Cl.[2] H01R *5/10*; F16G *11/02*

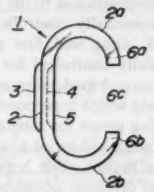
U.S. Cl. 24—129 W 3 Claims

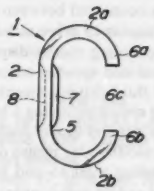
1. A wire connecting sleeve having a generally C-shaped configuration comprising:

a generally vertical back portion,

a pair of curved opposed end portions integral with and extending from said back portion, said end portions being spaced sufficiently to receive a cable therebetween,

a plurality of elongated ribs struck from said back portion and parallel to the lateral edges of said back portion, the presence of said ribs leaving correspondingly shaped recesses in said back portion, said ribs being confined to said back portion and terminating short of said curved opposed end portions, said ribs when extending from the outer face of the back portion constituting no more than 30% of the peripheral dimension of the C-shaped configuration, and said ribs when extending inwardly from the





inner face of said back portion constituting no more than 25% of said peripheral dimension.

4,087,890

COMPOUND LATHE

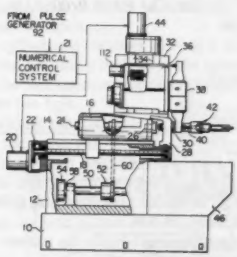
Shinichi Ishizuka, and Kenji Sugimoto, both of Tokyo, Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Jul. 3, 1975, Ser. No. 592,967

Claims priority, application Japan, Sep. 10, 1974, 49-103438; Sep. 10, 1974, 49-103440; Oct. 25, 1974, 49-122394

Int. Cl.[2] B23B *7/06*, *11/00*, *13/02*

U.S. Cl. 29—27 C 17 Claims



1. A lathe comprising a bed having horizontally disposed first guideways, a headstock horizontally slidable on said first guideways, a spindle rotatable in said headstock and having workpiece gripping means provided at a forward end portion of said spindle to grip a workpiece, a workpiece support detachable mounted on said bed in a coaxial relationship with said spindle at a position adjacent a forward end portion of said first guideways, a vertically extending column fixed to said bed at one adjacent side of said first guideways and at the same side as said headstock with respect to a plane perpendicular to the axis of said spindle and passing through a forward end of said workpiece support, second guideways provided on said column substantially vertically extending in a plane parallel to the axis of said spindle at a position adjacent a forward end portion of said first guideways, a saddle located at the same side as said headstock with respect to said plane passing through said forward end of said workpiece support and slidable on said

second guideways to be vertically movable along a path overlying the slidable path of said headstock, a turret rotatably supported by said saddle and vertically movable therewith along a path which is perpendicular to the axis of said spindle, first driving means numerically controlled for horizontally feeding said headstock along said first guideways, second driving means numerically controlled for vertically moving said saddle along said second guideways and thereby moving said turret along said path which is perpendicular to the axis of said spindle, third driving means for rotating said spindle, and indexing means for rotating said turret to an indexed position, said turret including a hollow shaft horizontally extending through said saddle and drivingly connected to said indexing means for rotating said turret, a rotatable shaft extending through said hollow shaft, a plurality of tool gripping means mounted on said turret and drivably connected to said rotatable shaft, a drive train connected between said rotatable shaft and said third driving means to drive at least one of said tool gripping means, first coupling means disposed between said third driving means and said spindle, second coupling means disposed between said third driving means and said rotatable shaft, and said indexing means including a horizontally extending shaft having an axis parallel to said hollow shaft and rotatably supported by said saddle, gear means drivably connecting said horizontally extending shaft to said hollow shaft, and a motor mounted on said saddle and connected to said horizontally extending shaft to rotate said turret for indexing.

4,087,891

TURRET TOOLPOSTER

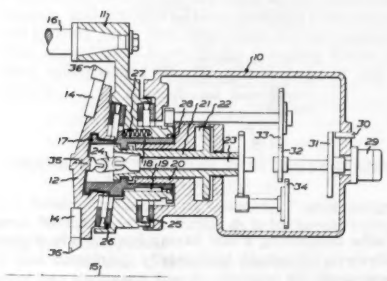
Stig Schering, Vesteras, Sweden, assignor to SMT Machine Company AB, Vesteras, Sweden

Filed Dec. 17, 1976, Ser. No. 751,740

Claims priority, application Sweden, Dec. 22, 1975, 7514528; Oct. 25, 1976, 7611832

Int. Cl.[2] B23B *9/00, 3/16*

U.S. Cl. 29—36 **6 Claims**



1. A turret toolpost for numerically controlled automatic lathes comprising

first and second independently indexable disc turrets having cutting tools mounted therein,

said cutting tools including external cutting tools and internal cutting tools,

said first turret having said external cutting tools attached thereto,

said second turret having a larger diameter than said first turret and having said internal cutting tools attached thereto as boring bars,

axes of said first and second turrets making a small acute angle with one another.

4,087,892

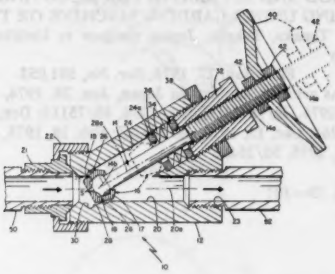
REGULATING FLOW

Irwin H. Davlin, Opelousas, La.

Division of Ser. No. 613,280, Sep. 15, 1975, Pat. No. 4,009,865. This application Aug. 6, 1976, Ser. No. 712,185

Int. Cl.[2] B23P *13/00*

U.S. Cl. 29—157.1 R **1 Claim**



1. A method of making a straight-through flow valve capable of metering fluid passing therethrough, said method comprising the steps of:

providing a valve body large enough to contain a flow passage therethrough and to contain a bore guiding a valve stem, said bore entering said flow passage at an acute angle to said flow passage,

drilling a first hole into said body short of penetration therethrough, to form a first bore therein,

drilling a second hole into said body coaxially with said first bore and shorter than said first bore to form a second bore therein, said second bore having a diameter greater than said first bore and having a lower surface at an angle facing inwardly to said first bore, the wall of said first hole intersecting with the bottom of said second bore in a circle defining a valve seating having a line-contact edge defined by the first and second holes,

drilling a third hole through said body at an acute angle to the axis of said first and second bores, the axis of said third hole passing through the center of said valve seat circle, said third hole forming a flow passage through said body, and

placing a conical valve head into said first and second bores for axial movement therein into and out of contact with the edge of said seat, for regulating flow, said head being fully removed from said flow passage in the wide-open condition of said valve.

4,087,893

PROCESS FOR PRODUCING A HEAT PIPE

Takeo Sata; Masayuki Takamura; Norio Shinoda, and Masataka Hatae, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Nov. 5, 1975, Ser. No. 628,977

Claims priority, application Japan, Nov. 8, 1974, 49-128053; Feb. 7, 1975, 50-15373

Int. Cl.[2] B23P *15/26;* **B21C** *23/10*

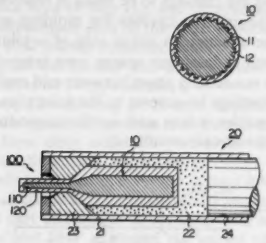
U.S. Cl. 29—157.3 A **17 Claims**

1. A process for producing a heat pipe, comprising the steps of:

forming a billet comprising a water soluble salt core and an axially elongated non-water soluble sheath, said sheath including a plurality of axially extending capillary grooves formed along the inner periphery thereof, said salt core filling the interior of said sheath including said axially extending capillary grooves;

subjecting said billet to compulsory plastic deformation by extrusion in such a manner that the dimensions of said sheath, including the dimensions of said capillary grooves,

as measured in the radial direction are reduced; and thereafter



removing said core through solution in water to obtain said heat pipe.

4,087,894

METHOD OF MANUFACTURE OF WATCH CASE

Gottfried Kuechli, Bienne, and Paul Volgyi, La Neuveville, both of Switzerland, assignors to Societe Suisse pour l'Industrie Horlogere Management Services, S.A., Bienne, Switzerland

Filed Nov. 29, 1976, Ser. No. 745,708

Claims priority, application United Kingdom, Dec. 4, 1975, 49841/75

Int. Cl.[2] B23P *13/00*

U.S. Cl. 29—179 4 Claims

1. A process for the manufacture of a watch case from an electrically conductive hard material compounded from aluminum oxide and titanium carbide comprising the steps of:

initially forming a blank by sintering the material under pressure and isostatic compacting at high temperature and gas pressure;

subjecting the blank to a heat treatment including the steps of heating the blank under a vacuum ranging from 5×10^{-4} to 5×10^{-5} Torr during a period of 2 to 5 hours to a temperature ranging between 1100° C and 1400° C, maintaining the maximum temperature for a period of 2 to 6 hours, cooling under vacuum to a temperature of about 300° C, restoring ambient pressure and cooling at a rate of about 140° C/hour until ambient temperature is reached;

spark machining the blank to its final form; and,

fine grinding and polishing the blank to a desired finish.

4,087,895

DEVICE FOR RAPIDLY EXCHANGING AN ACCUMULATOR BATTERY ON AN ELECTRIC VEHICLE

Michel Etienne, Valmondois, France, assignor to Automobiles Peugeot, Paris, France

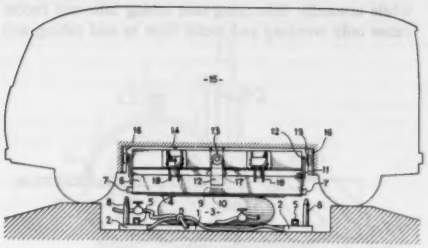
Filed May 13, 1977, Ser. No. 796,653

Claims priority, application France, Jun. 17, 1976, 76 18385

Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—252 10 Claims

1. A device for rapidly exchanging an accumulator battery on an electric vehicle, said device comprising a pallet, means for rendering said pallet easily movable with respect to the ground, a raising device disposed between said pallet and the battery to be exchanged, means for guiding the battery with respect to the pallet, means for guiding the battery with respect



to the vehicle, and means for hooking and locking the battery with respect to the vehicle.

4,087,896

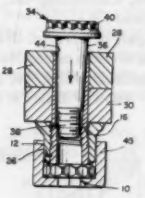
SLEEVE BOLT INSTALLATION NUT

Larry Salter, Lakewood, Calif., assignor to Paul R. Briles, Inglewood, Calif., a part interest

Filed Sep. 17, 1976, Ser. No. 724,412

Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—256 5 Claims



1. An installation nut for use with positioning a sleeve bolt in a cylindrical opening in a plurality of materials adapted to be connected together comprising,

a first hollow cylindrical member having a wrench surface on one end and a butting surface at the other end adapted to contact the bottommost portion of the sleeve when positioned on the bolt,

said first cylindrical member having external threads on a portion of the external surface and internal threads adapted to accept and hold the bolt,

a second hollow cylindrical member having internal threads for mating with said external threads on said first portion and a butting surface at one end adapted to contact the bottommost surface of material being connected together, and

a locking member for locking said first member to said second member in any relative position.

4,087,897

METHOD OF MAKING AN END CONNECTION TO A FLUID POWER CYLINDER AND PRODUCT

Edward Harold Scholefield, Wilmington, Ohio, assignor to Airmatic/Beckett-Harcum, Inc., Wilmington, Ohio

Filed Mar. 22, 1976, Ser. No. 669,280

Int. Cl.[2] B21D *39/00*; B23P *11/00*

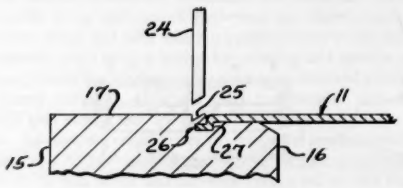
U.S. Cl. 29—509 4 Claims

1. A method of making an end connection to a fluid power cylinder comprising the steps of:

providing a cylindrical end cap having a reduced diameter, integral shank at one end thereof and defining with the remainder of said cap a radially extending shoulder, said shank being equipped with a channel-shaped annular inwardly extending recess adjacent said shoulder,

inserting said shank into a hollow metallic cylindrical tubing to cause said tubing to abut said shoulder,

simultaneously forcing said tubing against said shoulder while inwardly deforming said tubing into said recess to cause cold working and metal flow in said tubing and to



form an integral, generally right-angle step portion therein, and

deforming said end cap to cause an integral portion thereof to overlie and clamp said right-angle step portion to said shank.

4,087,898

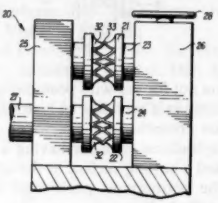
METALLIC ROD PRODUCT, AND METHOD FOR PRODUCING SAME

Robert Steven Linne, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Continuation-in-part of Ser. No. 598,976, Jul. 24, 1975, abandoned, which is a division of Ser. No. 543,058, Jan. 22, 1975, abandoned. This application Dec. 10, 1976, Ser. No. 749,570

Int. Cl.[2] B21C *9/00*

U.S. Cl. 29—527.5 **19 Claims**



1. A method of providing an improved metallic rod product for subsequent forming into wire, comprising the steps of:

(a) continuously casting molten metal into a cast bar,

(b) substantially immediately hot-forming the cast bar into rod, and

(c) forming minute channels, of at least 20 microinches roughness substantially uniformly about the circumference of the rod while in the hot-forming range, and

(d) cooling the rod.

4,087,899

PRODUCTION OF METAL CASTINGS

Claude Chevalier, La Chapelle-sur-Erdre; Raymond Le Diouron, Grenoble; Christian Schoutteten, Saint Herblain; Daniel Le Floch, Lorient, and Jean-Pierre Le Bot, Hennebont, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Mar. 31, 1977, Ser. No. 783,315

Claims priority, application France, Apr. 2, 1976, 76 09701

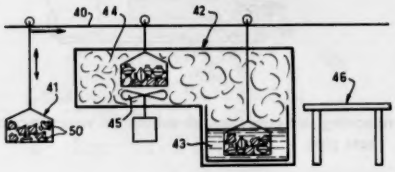
Int. Cl.[2] B22D *11/12, 31/00*

U.S. Cl. 29—527.6 **2 Claims**

1. In a method of producing cast iron sand castings, comprising forming a set of castings incorporating casting runners and risers, subjecting said castings to mechanical shock to cause separating fractures at the margins of each casting at the locations of said runners and risers; the improvement comprising

a. arranging the castings to be small in relation to a molding box, arranging the cavities for molding said castings in pairs one situated on either side of a joint plane of the mold with at least one spacer core interposed and with multiple connecting zones between said castings forming a pair of castings transverse to the joint plane of the mold,

b. casting molten iron in said cavities to produce ductile cast iron in the as-cast condition,



c. prior to said subjection to mechanical shock, cooling said paired castings in a refrigeration zone by immersion in a bath of liquid nitrogen preceded by precooling with vapor of nitrogen thus vaporized, continuing said cooling for just long enough for the embrittling temperature of the cast iron to be reached at the points where said runners and risers break from the castings, and then performing said operation of subjection to mechanical shock in situ.

4,087,900

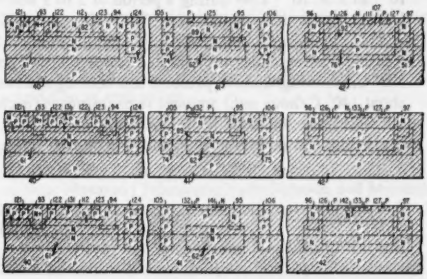
FABRICATION OF SEMICONDUCTOR INTEGRATED CIRCUIT STRUCTURE INCLUDING INJECTION LOGIC CONFIGURATION COMPATIBLE WITH COMPLEMENTARY BIPOLAR TRANSISTORS UTILIZING SIMULTANEOUS FORMATION OF DEVICE REGIONS

Aristides Antony Yiannoulos, Reading, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 18, 1976, Ser. No. 733,057

Int. Cl.[2] H01L *21/22, 21/20*

U.S. Cl. 29—578 **9 Claims**



1. The method of fabricating an integrated circuit in a monolithic semiconductor body, said circuit including a logic gate of the injection logic type in a first portion of said body and complementary bipolar transistors of the NPN and PNP type in second and third portions of said body respectively, said monolithic body comprising a monocrystalline silicon substrate and no more than one epitaxially deposited layer of silicon over said substrate, said complementary transistors being fabricated by the following steps:

(1) introducing a first N-type dopant into a first limited surface area of the third portion substrate to form the PNP collector isolation zone,

(2) introducing a second N-type dopant into a limited surface

area of the second portion substrate to form the NPN buried collector zone,

(3) introducing a P-type dopant into a part of said first limited surface area of step (1), and completely within said first limited surface area of the third portion substrate to form the PNP buried collector zone,

(4) forming on the second and third portion substrate an epitaxial layer of N-type silicon,

(5) selectively introducing an N-type dopant into surface areas of the epitaxial layer on said second and third portions to form deep collector connection zones, and an annular isolation zone, respectively,

(6) selectively introducing a P-type dopant into the surface area of said epitaxial layer of said third portion, coincident with said part of Step (3) to reconvert the epitaxial layer portion of the PNP adjoining the buried collector from N-type to P-type,

(7) selectively introducing an N-type dopant into a surface area of the epitaxial layer on said third portion to form the base zone of said PNP transistor,

(8) selectively introducing a P-type dopant into a surface area of the epitaxial layer on said second portion to form the base zone of said NPN transistor,

(9) selectively introducing a P-type dopant into a portion of the base zone of said PNP transistor to form an emitter zone,

(10) selectively introducing an N-type dopant into a portion of the base zone of the NPN transistor to form an emitter zone,

the method characterized in that the logic gate is formed in the first portion simultaneously by the following sequence of steps performed simultaneously with specific steps performed on the second and third portions,

(a) introducing an N-type dopant in accordance with Step (2) for forming an N-type buried layer in said first portion,

(b) selectively introducing a P-type dopant in accordance with Step (3) for forming a P-type buried layer within said N-type buried layer formed in step (a),

(c) forming on said first portion in accordance with Step (4) an N-type epitaxial layer,

(d) selectively introducing an N-type dopant into surface areas of the epitaxial layer on said first portion in accordance with Step (5),

(e) selectively introducing a P-type dopant into an annular surface area of the epitaxial layer on said first portion in accordance with Step (6) to isolate a portion of said epitaxial layer above the P-type buried layer formed in step (b), and

(f) then, in a step not necessarily performed simultaneously with specific steps performed on the second and third portions of the chip, forming a rectifying connection to a limited region of the N-type epitaxial layer on said first portion, said region being spaced away from the P-type doped areas formed in Step (e).

4,087,901

TOOL CHANGE MECHANISM FOR MACHINE TOOLS

Earl R. Lohneis, and Frank Zankl, both of Milwaukee, Wis., assignors to Kearney & Trecker Corporation, West Allis, Wis.

Filed Aug. 16, 1976, Ser. No. 714,496
Int. Cl.[2] B23Q *3/157*
U.S. Cl. 29—568 **13 Claims**

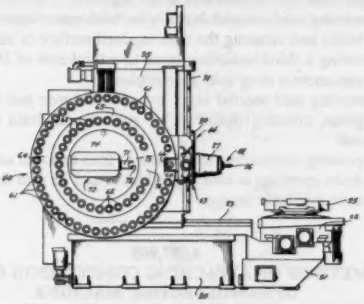
1. In a tool change mechanism for a machine tool having a work station;

a tool storage magazine carrying a plurality of sockets for receiving tools to be used at said work station;

a carrier supported for pivotal movement between a tool change position adjacent to said work station and a loading position adjacent to said magazine;

a tool change arm operably mounted on said carrier for movement therewith;

a tool ready socket formed in said carrier for supporting a tool in position to be engaged by said tool change arm so that the tool change arm may be operated when said carrier is in the tool change station for interchanging a new tool in said ready socket with the previously used tool in said work station; and



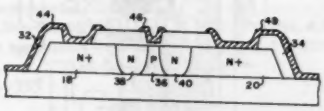
transfer means operable when said carrier is in the loading position to remove the previously used tool from said ready socket and return it to said magazine and replace it with a new tool from said magazine for use at said work station.

4,087,902

FIELD EFFECT TRANSISTOR AND METHOD OF CONSTRUCTION THEREOF

William R. Feltner, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 23, 1976, Ser. No. 699,012
Int. Cl.[2] B01J *17/34*
U.S. Cl. 29—571 **3 Claims**



1. The method of making a field effect transistor comprising:

forming on an insulating substrate at least one island comprising semi-conductor material of a first conductivity type, said island being in the form of a layer 0.8 to 1.2 micrometers in thickness;

growing over the outer surface of said island a first, upper, thin masking layer 150 to 250 nanometers in thickness;

removing two separated regions of said first upper layer, leaving an intermediate region of this layer as a mask;

diffusing into the thus exposed separated regions of said wafer a material increasing the conductivity of the thus exposed separated regions, the increase being in the same polarity direction as the existing polarity of said semi-conductor material to thus create two separated enhanced discrete polarity regions comprising source and drain regions;

removing the balance of said first insulating layer and growing a second insulating layer over the outer body of said wafer to a thickness of 800 to 1,000 nanometers, then etching a window in a small central portion, smaller than but within the area in which said intermediate region of said first layer was located, where a reduced thickness of 30 to 40 nanometers is grown to define a gate region;

bombarding said gate region with an opposite, second, polarity type ion bombardment, the dosage of said bombardment being that required to exceed the original degree of

impurity concentration in said wafer to a selected degree, whereby there is created a gate region of a second polarity separated from said source and drain regions by modified regions of said first polarity type, but of lesser conductivity than said source and drain regions;

removing said second layer over said gate region of said wafer and cleaning the thus exposed surface of said wafer;

growing a third insulating layer to a thickness of 100 to 110 nanometers over said gate region;

removing said second layer over said source and drain regions, creating openings for source and drain contacts; and

depositing conductive electrodes to thus exposed source and drain openings in said second layer and on said third layer over said gate region.

4,087,903

METHOD OF ATTACHING COMPONENTS OF A DYNAMOELECTRIC MACHINE

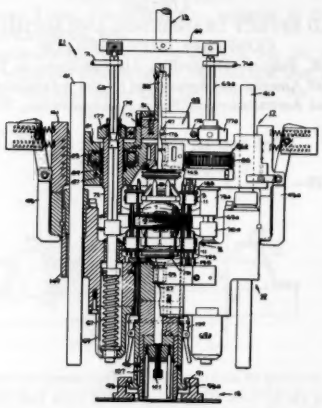
Jesse A. Stoner, Scotia, N.Y., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 539,038, Jan. 6, 1975, Pat. No. 4,004,725. This application Sep. 28, 1976, Ser. No. 727,505

The portion of the term of this patent subsequent to Aug. 17, 1993, has been disclaimed.

Int. Cl.[2] H02K *15/14*

U.S. Cl. 29—596 **14 Claims**



1. A method of attaching a pair of opposite end frames of a dynamoelectric machine to a structural component thereof, the method comprising the steps of:

(a) positioning the end frame pair and the structural component in an apparatus adapted to be actuated so as to automatically assemble them in an aligned assembly position with the structural component disposed within a pair of means for receiving it provided in the end frame pair, respectively;

(b) moving at least one end frame of the end frame pair and the structural component with respect to the other thereof into the aligned assembly position upon actuation of the apparatus which effects such movement;

(c) providing in one of the receiving means of one of the one end frame and the other of the end frames a hardenable material and flowing the hardenable material in the one receiving means so as to form a rigid tie between the structural component and the one of the one and other end frames upon the hardening of the hardenable material; and

(d) inverting the end frame pair and the structural component in the aligned position thereof in the apparatus and disposing the other of the receiving means in the other of the one and other end frames in position for introducing additional hardenable material thereinto.

4,087,904

METHOD TO MANUFACTURE GLOW PLUGS, PARTICULARLY TO SECURE GLOW ELEMENTS IN SOCKETS

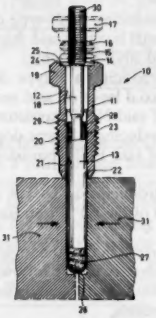
Leo Steinke, Waiblingen-Hegnach, and Josef Tosch, Schwieberdingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Jan. 13, 1977, Ser. No. 759,130

Claims priority, application Germany, Mar. 6, 1976, 2609294

Int. Cl.[2] H05B *3/00*

U.S. Cl. 29—611 **10 Claims**



1. In the manufacture of glow plugs, a method of securing a glow element (23) in a socket of the glow plug (10) in which the glow element comprises

a thin-walled, closed metal sleeve (23), a heating wire (27) within the sleeve, and a filling of good heatconductive insulating material within the sleeve and surrounding the heating wire;

and in which the socket comprises a metallic body (11) formed with a bore (12) therethrough,

said method comprising the steps of

smoothly finishing at least a zone (21) of the bore (12) to be free from grooves, ridges, or surface imperfections and discontinuities at its inner walls, and having an accurate size of predetermined diameter;

forming the outer diameter of the sleeve to have a slightly larger diameter than said predetermined diameter of the zone (21) of the socket (11);

guiding the sleeve (23) and the bore (12) in the body (11) in axial alignment;

and press-fitting the sleeve into the bore by relatively moving the sleeve and the body, in axial alignment, over a predetermined distance to seat the sleeve in the bore by an interference fit and hold the sleeve gas-tight in the bore by radial pressure of the socket against the wall of the sleeve.

4,087,905

METHOD OF PREPARING A POWDERED, ELECTRICALLY INSULATIVE SEPARATOR FOR USE IN AN ELECTROCHEMICAL CELL

Tom O. Cooper, and William E. Miller, both of Naperville, Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

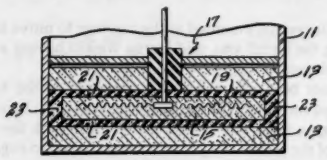
Filed Mar. 30, 1977, Ser. No. 782,874

Int. Cl.[2] H01M *10/28*

U.S. Cl. 29—623.1 **7 Claims**

1. A method of preparing an electrode structure for use in a secondary, electrochemical cell comprising disposing a layer of a particulate mixture of powdered, refractory, electrically insulative material blended with a binder of powdered, electrolytic salt selected from alkali metal halides, alkaline earth metal

halides, and mixtures thereof within a die suitable for pressing powders; centrally placing an electrode compact onto said particulate mixture layer within said die to define an annular volume around said electrode compact within the die walls; filling said annular volume and covering the upper surface of



said electrode compact with additional amounts of said particulate mixture including powdered, refractory, electrically insulative material; and pressing said layers and electrode compact and particulate mixture to form an integral structure having a compacted layer including refractory, electrically insulative particles at all outer surfaces.

4,087,906

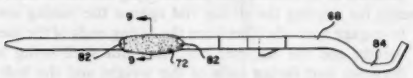
METHOD OF SELECTIVELY APPLYING SOLDER ONTO CONDUCTORS

Robert Franklin Cobaugh, Elizabethtown, and Kenneth Ronald Parmer, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 487,505, Jul. 11, 1974, Pat. No. 3,915,546, which is a division of Ser. No. 306,498, Nov. 14, 1972, Pat. No. 3,849,870, which is a continuation-in-part of Ser. No. 153,315, Jun. 15, 1971, abandoned. This application Jul. 29, 1975, Ser. No. 600,162

Int. Cl.[2] H01R *9/16*

U.S. Cl. 29—630 D **4 Claims**



3. A method of treating electrical contacts prior to insertion through plated openings in a board type substrate comprising the steps of:

forming solder bands on said electrical contacts; and

subjecting each of said solder bands to a prescribed pressure whereby the shape of each of said bands is modified, said step of subjecting includes the steps of:

elastically deforming a first portion of the solder in each of said solder bands; and,

forming numerous fractures in a second portion of each of said solder bands, whereby the structural integrity of said second portion of each of said solder bands is substantially reduced.

4,087,907

APPARATUS FOR FEEDING CABLE WIRES THROUGH AN ELECTRICAL CONNECTOR GROMMET

Billy E. Taylor, Richardson, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 22, 1976, Ser. No. 743,563

Int. Cl.[2] H01R *43/00*

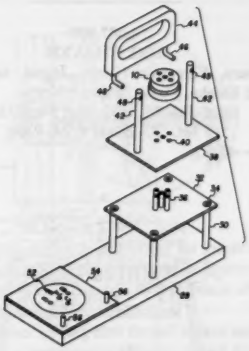
U.S. Cl. 29—721 **9 Claims**

1. Fixture apparatus for facilitating the feeding of cable wires through the individual apertures of an electrical connector grommet, comprising:

a first flat plate mounted on a support base

an array of tubular pins embedded in said first plate so that they pass therethrough an extend out from at least one of its surfaces, patterned for individual insertion of the pins in individual apertures of the grommet;

a second flat plate having a thickness which is less than the length of the extended portions of said pins and at least one aperture traversed by said pins when said second plate is placed over said first plate, configured such that when



the grommet is thereafter emplaced on said array at least a portion of the grommet contacts the surface of said second plate so that said plates cannot be separated by moving the second plate away from the first without likewise separating the grommet from said array, and

said second plate including a handle and means for attaching said handle to said second plate.

4,087,908

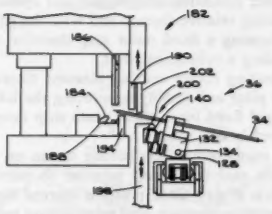
CONNECTOR HARNESS ASSEMBLY MACHINE

Vito A. Fusco, Palos Hills; Joseph C. Bennett, Lisle; Jack F. Funcik, Downers Grove; Kenneth L. Kufner, Hickory Hills, and Thomas E. Schneider, Burbank, all of Ill., assignors to Molex Incorporated, Lisle, Ill.

Division of Ser. No. 659,004, Feb. 18, 1976, Pat. No. 4,055,889. This application Feb. 22, 1977, Ser. No. 770,853

Int. Cl.[2] H01R *43/04*

U.S. Cl. 29—753 **2 Claims**



1. In a wire handling and fabrication machine including wire preparation means for presenting an insulation clad wire cut and stripped in a predetermined manner at a wire pickup station, a crimp station having a plurality of terminals and means for crimping a terminal onto a wire, a wire carrier for holding a wire, and intermittent drive means associated with said wire carrier for moving said wire between said stations, the improvement comprising:

wire guide means at said crimp station and associated with said crimping means, said wire guide means including a slot open at the top to receive and align the wire lead at the crimp station;

said wire carrier including means for pivoting said carrier between a first position wherein a wire lead is in an upwardly slanted position over said slot and a second posi-

tion wherein said wire lead is in a substantially horizontal position; and

movable carrier deflector means associated with said crimping means for engaging said wire carrier and moving said wire carrier between its first position and its second position so that the wire lead is moved into and out of said slot.

4,087,909

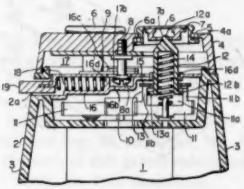
DRY SHAVER

Akio Naemura, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 20, 1972, Ser. No. 273,457

Int. Cl.[2] B26B *9/14, 9/04*

U.S. Cl. 30—43.6 **19 Claims**



1. A dry shaver comprising a casing including a holder provided with at least one opening in the head thereof, a shear plate suspended to be tiltable with respect to the direction perpendicular to the central longitudinal axis of the casing, a rotary blade operatively associated with said shear plate, a driving means, and a drive shaft for coupling the rotary blade to the driving means, said rotary blade being fixed to a drive shaft with no play therebetween, and a compression spring provided between the driving means and the drive shaft for forcing the rotary blade to the shear plate, thereby making the compression force of the compression spring against the rotary blade and thus the shear plate parallel to the driving shaft and perpendicular to the shear plate at all times, said drive shaft being supported at the lower end thereof in a manner to be universally tiltable with respect to the direction parallel to the central longitudinal axis of the casing.

17. A dry shaver comprising:

(a) a shaver housing including a shaving head having at least one opening therein,

(b) a shear plate disposed within said opening and adapted for tilting relative thereto and with the edge of said opening forming a fixed outer stop therefor, said shear plate including a cylindrical wall,

(c) a floating rotary cutting element disposed within said shear plate and tiltably supporting the latter,

(d) a rigid fixed inner shear plate stop member removably secured in said head,

(e) and cooperative interlocking means on said shear plate and on said fixed stop member to prevent shear plate rotation at any tilted position thereof during rotation of said cutting member, said interlocking means comprising:

(1) recess means comprising at least one notch formed in said cylindrical wall,

(2) and a fixed projection formed in said rigid stop member and disposed within said notch.

4,087,910

NUTCRACKER DEVICE

John S. Doyel, 404 W. 20th St., New York, N.Y. 10011

Filed Jan. 12, 1977, Ser. No. 758,674

Int. Cl.[2] A47J *43/26*

U.S. Cl. 30—120.5 **5 Claims**

1. A hand-operated device for shattering rather than crushing nut shells comprising:

an elongated gun-like body having a barrel, a breech, and a pistol grip;

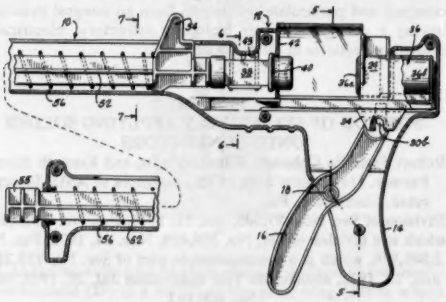
a trigger mounted at the pistol grip for movement toward and away from the grip and a loading carriage mounted at the breech for movement along the barrel axis, said trigger being connected to the loading carriage to move the carriage forwardly with movement of the trigger toward the pistol grip and said carriage being free to move backwardly with movement of the trigger away from the pistol grip;

an inertia weight mounted at the carriage to move therewith along the barrel axis, said inertia weight having a forward end shaped to engage a nut shell;

a hammer bolt mounted at the back end of the barrel for limited movement along the barrel axis, said hammer bolt having a back end facing and aligned with the forward end of the inertia weight and being shaped to engage a nut shell;

a striker rod extending along the barrel and guided thereby for movement along the barrel axis;

means for biasing the striker rod toward the back end of the



barrel, said rod engaging the hammer bolt in its biased position to maintain the hammer bolt in the backmost position of its limited movement along the barrel axis; and

means for moving the striker rod against the biasing means to engage a nut shell between the facing ends of the inertia weight and the hammer bolt, said nut shell being held between said facing ends of the weight and the bolt by moderate pressure of the trigger against the pistol grip, and to move the striker rod, the hammer bolt and the inertia weight forwardly against the biasing means to the extent of the limited movement of the hammer bolt, said striker rod being moveable manually further forwardly against the biasing means and when released carrying out a back stroke under the action of the biasing means, said rod in its back stroke striking the hammer bolt and the hammer bolt in turn striking the nut shell to impact and shatter said nut shell, said nut shell being backed up both by the inertia of the inertia weight and by said moderate pressure on the trigger.

4,087,911

FINGER HOLE KNIFE

Maurice D. Schrock, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of New York, N.Y. 10007

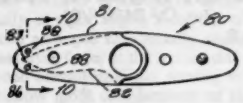
Filed Nov. 20, 1975, Ser. No. 633,850

Int. Cl.[2] B26B *29/00*

U.S. Cl. 30—286 **2 Claims**

1. A finger hole knife, comprising a knife blade and a handle having a transverse finger hole formed through a forward portion of said handle, said blade having a cutting edge extending rearwardly from a front tip to a wider rear section of the blade which extends from the said forward portion of the handle, said finger hole being spaced from the said rear section of the blade, said forward portion of the handle including an outer edge encompassing a portion of the said hole and extending outwardly beyond the said cutting edge of the blade to

provide a better grip and protective protrusion, protecting the fingers of the user from the said cutting edge, a leaf spring guard comprising an elongated leaf spring integral at one end with a sleeve rotatably fitted in said hole, having radially outward flanges at each end of said sleeve, said leaf spring being longitudinally curved whereby a forward end bears



against said blade tip, said leaf spring guard being pivotal to longitudinally extend forwardly superposed over the said blade in a closed position and to longitudinally extend rearwardly superposed over the said handle in an open position exposing the blade, and including means for retaining the guard in either of said positions.

4,087,912

PUNCH

Charles J. Granone, 452 Gavilan Pl., NW., Albuquerque, N. Mex. 87107

Filed Jan. 21, 1976, Ser. No. 651,000
Int. Cl.[2] B26F 1/00
U.S. Cl. 30—366 4 Claims

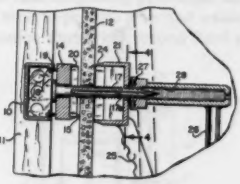
1. An elongated punch consisting essentially of:
(a) a handle having a striking surface at one end and
(b) a stepped working portion of unitary construction carried by said handle at the end opposite to said striking surface, said stepped working portion having
(i) a conical pointed end remote from said handle,
(ii) a plurality of integral cylindrical punching portions of sequentially greater cross-section in the direction of said handle, the cylindrical punching portion having the smallest cross-section being located immediately adjacent said pointed end and being of a diameter equal to the diameter of the base of said conical pointed end, and
(iii) a plurality of frustoconical portions each of which has a length substantially less than the length of said cylindrical punching portions, one of said frustoconical portions being located between and connecting each pair of adjacent cylindrical punching portions, whereby said elongated punch can be used to pierce a work material in a manner to form holes of different diameter depending solely on the depth of penetration of said stepped working portion through the work material.

4,087,913

UTILITY FIXTURE LOCATOR AND CUTTER

Hubert Hassel Jackson, 2512 21st St., Santa Monica, Calif. 90405

Filed Apr. 22, 1977, Ser. No. 789,889
Int. Cl.[2] B26F 1/00
U.S. Cl. 30—360 5 Claims



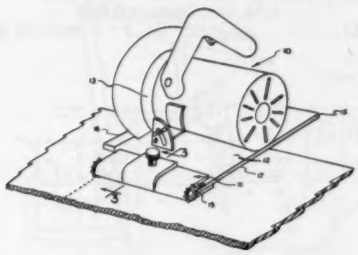
1. A utility fixture locator and cutter for locating and cutting an opening of given shape in a panel to be positioned over the fixture to thereby provide access to the fixture after said panel is in place, comprising, in combination:
(a) a first member having first thread means and hole punching means for temporarily affixing to said fixture such that said panel can be positioned over said fixture and pressed towards the fixture to cause said hole punching means on said member to penetrate through said panel thereby indicating on the exterior of the panel the location of said fixture;
(b) a second member having cutting blades outlining said given shape receivable over the hole punching means with the cutting blades opposing the exterior surface of the panel; and
(c) cooperating second thread means for engaging said first thread means and rotatable to force said first and second members towards each other to thereby cut an opening in said panel of said given shape.

4,087,914

GUIDE ASSEMBLY FOR PORTABLE SAWS

Arthur Edward Bates, 15481 Marine Drive, White Rock, British Columbia, Canada (V4B 1C9)

Filed May 20, 1977, Ser. No. 798,803
Int. Cl.[2] B27B 9/04
U.S. Cl. 30—374 6 Claims



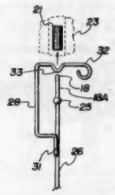
1. A guide assembly for attachment to a sole plate of a powered hand-saw comprising:
(a) an elongated roller having axially spaced apart mutually rotatable end portions,
(b) means for securing the roller at the forward end of and extending transversely to the saw sole plate and with the said end portions projecting below the sole plate,
(c) said end portions of the outer roller being adapted to grip the surface of the work piece so as to inhibit angular deviation of the saw as it is moved over the work-piece.

4,087,915

ORTHODONTIC SAFETY FACE BOW

Lawrence F. Andrews, 2025 Chatsworth Blvd., San Diego, Calif. 92107

Filed Jul. 7, 1975, Ser. No. 593,327
Int. Cl.² A61C *7/00*
U.S. Cl. 32—14 D **2 Claims**



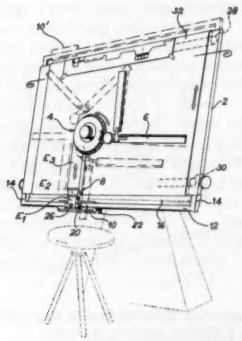
1. In an orthodontic safety face bow composed of:
an inner wire and an outer wire, said inner wire and outer wire being coupled together at central portions thereof, said outer wire having first and second ends adapted for coupling to a head cap and/or a neck pad, said inner wire having first and second ends adapted for being received by buccal tubes; the improvement comprising
first and second safety extensions being coupled at one end to said inner wire and extending freely beyond said inner wire's first and second ends, respectively, terminating in looped portions through a location which intersects an extension of the axis of respective of said first and second ends so that when said inner ends said safety extensions each including a detent portion at said locations for engaging with said buccal tubes are positioned to extend through one end of said buccal tubes, said safety extensions will engage the other end of respective of said buccal tubes and prevent displacement of said inner wire therefrom.

4,087,916

DRAWING TABLE WITH A TELESCOPIC ARM

Claude Goguillot, 17, rue des Martinets, 25290 Ornans, France

Filed Nov. 9, 1976, Ser. No. 740,210
Claims priority, application France, Nov. 12, 1975, 75 34391
Int. Cl.² B43L *13/00*
U.S. Cl. 33—76 R **1 Claim**



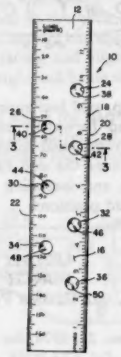
1. A drawing table comprising a drawing board and a telescopic arm constituted by members which fit one another, said arm having first and second end members, a carriage supporting said first end member, a horizontal rail mounted on said board, said rail slidably receiving said carriage, and a drawing set supported by said second end member, each of said members having an outer surface and an inner surface, said outer surface including along its length a magnetic strip and said inner surface including a magnet, a magnet of one member facing a magnetic strip of the adjacent member.

4,087,917

POSITIVELY POSITIONABLE RULER

Marley Sheerer, 15 Downing St., Plymouth, Pa. 18651

Filed Aug. 3, 1976, Ser. No. 711,116
Int. Cl.² B43L *7/00*
U.S. Cl. 33—107 R **3 Claims**



1. A positively positionable ruler comprising:
an elongated body member having a substantially flat lower surface for contacting a supporting surface and a substantially flat upper surface for marking indicia thereon, said body member having a plurality of cylindrical apertures located therein opening through said lower surface and said upper surface of said body member, said apertures forming an alternating pattern along two rows which run substantially parallel to the elongated axis of the body member, each of said apertures having a centrally located annular groove; and,
a plurality of cylindrical surface engaging elements, each of said elements having a centrally located annular ridge, thereby permitting each of said elements to be slideably disposed and retained within each of said apertures, said ridges resting in said grooves, the upper surface of said elements adapted to engage the fingers of a human hand, and a semi-resilient pad secured to the lower surface of each of said elements for frictionally engaging said supporting surface, thereby permitting one using said ruler to comfortably and positively position said ruler on said supporting surface by the naturally curved fingers of either hand.

4,087,918

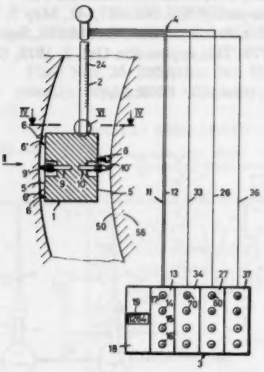
APPARATUS FOR MEASURING THE GEOMETRY OF THE HOLLOW MOLD COMPARTMENT OF CONTINUOUS CASTING MOLDS

Markus Schmid, Zurich, and Adolf Fuchs, Wadenswil, both of Switzerland, assignors to Concast AG, Zurich, Switzerland

Filed Jul. 21, 1976, Ser. No. 707,204
Claims priority, application Switzerland, Jul. 28, 1975, 9800/75
Int. Cl.² G01B *7/28*
U.S. Cl. 33—174 P **10 Claims**

1. An apparatus for measuring the geometry of a hollow arc-shaped mold compartment of a continuous casting mold, said mold compartment having a polygonal cross-section including at least four corners, comprising a measuring head having a lengthwise axis and displaceable essentially in the direction of said lengthwise axis, three impact elements arranged at a first side of the measuring head, said three impact elements forming a triangle which is essentially parallel to the

lengthwise axis of the measuring head, a first measuring feeler arranged at the first side of the measuring head and extending in a direction which is substantially perpendicular to the plane of the triangle, said first measuring feeler serving to bear against a neighboring wall of the hollow mold compartment of the mold, at least one resilient impact element arranged at a second side of the measuring head opposite the first side, said resilient impact element producing a force vector directed away essentially at right angles from the triangle, a second measuring feeler arranged substantially coaxially with respect to the first measuring feeler at the second side of the measuring head, the second measuring feeler serving to bear against the wall of the hollow mold compartment of the mold opposite said neighboring wall, at least one indicator element operatively connected with the measuring feelers in order to indicate the position thereof, said three impact elements defining three impact points which contact said neighboring wall of the hollow mold compartment of the continuous casting mold and



form a triangle surface of said triangle, two of said impact points being arranged in a plane disposed substantially transversely with respect to the lengthwise axis of the measuring head, said measuring head having a third side which merges with the first side at an angle of approximately 90°, a first impact element arranged at the third side in said plane and in spaced relationship from the triangle surface defined by the three impact points, a second impact element disposed at the third side along a line extending substantially parallel to the lengthwise axis of the measuring head and through the first impact element, one of said three impact elements of said triangle defining a lower impact element, said second impact element being located substantially at the height of said one lower impact element of said triangle, a third measuring feeler arranged at the third side at a greater spacing from the triangle, a further indicator element operatively connected with the third measuring feeler, and a resilient impact element provided at a fourth side of the measuring head which is opposite the third side.

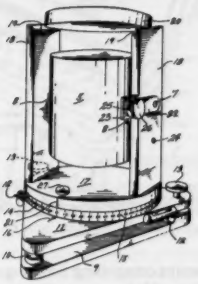
4,087,919

RATE INTEGRATING GYROSCOPIC AIMING METHOD AND DEVICE THEREFOR

Marius E. Huvers, Ste-Therese, Canada, assignor to Canadair Limited, Montreal, Canada

Filed Jul. 22, 1975, Ser. No. 598,134
Int. Cl.² G01C *19/36*
U.S. Cl. 33—301 **10 Claims**

8. An aiming method for a carrier comprising approximately aligning the carrier with a desired azimuth direction, providing a rate integrating gyroscope unit having a rotor, a gimbal, a housing and an output axis, positioning the rate integrating gyroscope unit with the output axis in the upright directon, approximately detent setting the input axis in azimuth relative to the East direction, producing one zeroing of the output of the pick-off of the gyroscope, allowing a first integration of the input rate of the rate integrating gyroscope unit for a fixed period of time to provide a first measurement of the output shaft rotation during the first period of time, rotating the rate integrating gyroscope unit exactly 180° about its upright output axis, producing another zeroing of the output of the pick-off of the gyroscope unit allowing a second integration of the input rate of the rate integrating gyroscope unit for the same fixed period of time to provide a second measurement of the output shaft rotation during the second fixed period of time,



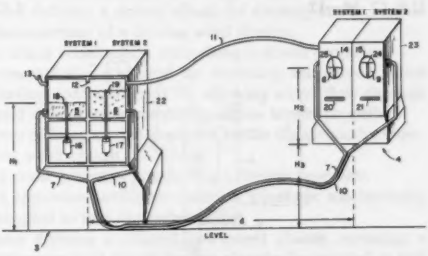
substracting one of said measurements from the other, correcting for local latitude and for any angular difference between the selected detent position and the required azimuth setting of the input axis introduced by the approximate detent setting of the latter, to define a measurement of the aiming error relative to the desired azimuth direction, toppling the rate integrating gyroscope unit exactly 90° about a topple axis basically extending in the direction of the spin axis, and rotating the carrier until a reading of the output of the pick-off indicates an azimuth correction of the carrier corresponding to said measurement of the aiming error.

4,087,920

TWO-FLUID TILTMETER

George R. Huggett, Mercer Island, Wash., and Larry E. Slater, Hollister, Calif., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Mar. 25, 1977, Ser. No. 781,272
Int. Cl.² G01C *5/04, 9/22*
U.S. Cl. 33—367 **12 Claims**



1. A two-fluid tiltmeter having two substantially identical adjacent systems exposed to the same thermal conditions, each of said systems containing a fluid with thermal density coefficients that are different from the other system and each system comprising:

two generally vertical fluid reservoirs which are separated from each so that each is located at a terminal pier;

interconnecting means for providing fluid communication between the reservoirs at their separated piers; and

means for measuring the differences in specific measurable fluid parameters between the fluid in the two reservoirs of the same system.

4,087,921

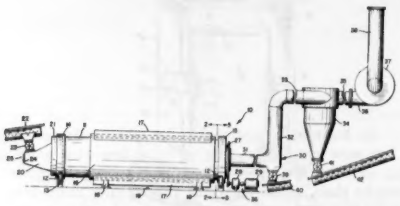
MICROWAVE DRYING APPARATUS

Arie Blok, 1604 Dale Cir., N., Dunedin, Fla. 33528

Filed Oct. 12, 1976, Ser. No. 731,678

Int. Cl.² F26B *3/34, 11/02*

U.S. Cl. 34—1 **8 Claims**



1. A drying apparatus comprising an elongated drum, means rotatively supporting said drum, means imparting rotation to the drum, means for heating the drum, said drum having an inlet end and an outlet end, means creating a suction in said outlet end, said inlet end being open for admitting air to the drum, means discharging a material to be dried into the air stream adjacent said open inlet end, and means for separating the dried material from the air stream beyond said outlet end and between said outlet end and the suction means, said heating means comprising microwave units secured to the exterior of said drum and revolving therewith, said microwave units extending longitudinally of the drum and being circumferentially spaced from one another, and electric conductor means including rotatively moving commutator rings and non-rotating conductor brushes engaging said rings and forming parts of electric circuits for said microwave units.

4,087,922

PRODUCTION OF HOMOGENEOUS MIXTURES OF DRY MATERIAL

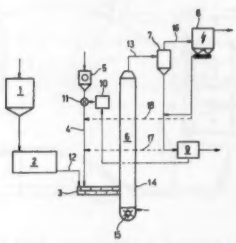
Jakob Hinterkeuser, St. Augustin, and Rolf Jehmlich, Cologne, both of Germany, assignors to Klöckner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Sep. 20, 1976, Ser. No. 724,616

Claims priority, application Germany, Sep. 20, 1975, 2542087

Int. Cl.² F26B *7/00*

U.S. Cl. 34—12 **7 Claims**



1. A process for drying a sludge, said sludge initially being comprised of an aqueous phase and a particulate solids phase, said process comprising the steps of continuously dewatering said sludge in a rotary drum type filter zone, charging said dewatered sludge and a particulate additive to a pneumatic conveyer type gas dryer to produce a mixed stream comprised of gas and dried particulate solids, first passing said mixed streams into a cyclone type separator and collecting separated particulate solids, secondly passing the residual gas stream from said cyclone type separator into an electrostatic type precipitator and collecting separated solids, analyzing by x-ray fluorescence the composition of said separated solids and generating a signal representative of such analysis, and maintaining said composition within predetermined limits by regulating the rate of said charging with said signal.

4,087,923

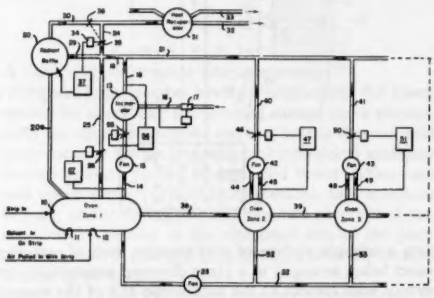
METHOD OF OPERATING AN INCINERATOR

Charles R. Wilt, Jr., Upper St. Clair Township, Allegheny County, and Floyd L. Schauermann, Gibsonia, both of Pa., assignors to Salem Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 467,647, May 7, 1974, abandoned, which is a division of Ser. No. 396,668, Sep. 13, 1973, Pat. No. 3,868,779. This application Oct. 2, 1975, Ser. No. 619,058

Int. Cl.² F26B *21/06*

U.S. Cl. 34—32 **9 Claims**



1. A method of operating an incinerator for the burning of combustible materials evolved from a product undergoing a drying operation in a drying oven supplied thereto with diluents mixed in a gaseous stream, comprising the steps of:

a. regulating to a constant rate the fuel input to the incinerator,

b. controlling to a substantially constant value the temperature of the mixed gaseous stream entering the incinerator, and

c. controlling the quantity of the mixed gaseous stream entering the incinerator as a function of the temperature of the gaseous stream at the incinerator outlet.

4,087,924

ROTARY-TYPE SLICE DRYER

Keizo Fujimoro, and Shigeharu Ohara, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed May 2, 1977, Ser. No. 792,993

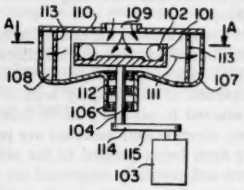
Claims priority, application Japan, May 8, 1976, 51-52336

Int. Cl.² F26B *17/24*

U.S. Cl. 34—58 **8 Claims**

1. A slice dryer comprising a rotatable basket adapted to have disposed therein a plurality of slices to be dried, a plurality of blades arranged in a circle that is concentric with the axis of rotation of said basket and surrounding said basket, each of said plurality of blades being directed at an angle relative to the tangential direction of said circle, a case placed outside said

plurality of blades and surrounding said blades and said basket, means for exhausting air and liquid provided on a side wall of



said case, and means for introducing drying air into said case in a direction along the axis of rotation of said basket.

4,087,925

HAND DRIER

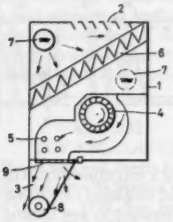
Artur Bienek, Wilhelm-Leuschner-Strasse 35, 5500 Trier, Germany

Filed Nov. 26, 1976, Ser. No. 745,460

Claims priority, application Germany, Dec. 6, 1975, 7538941[U]

Int. Cl.² F26B *19/00*

U.S. Cl. 34—60 **4 Claims**



1. In a hand drier including a housing having an air inlet and an air outlet, a fan in the housing operable to draw air into the housing through the air inlet and blow air out of the housing through the air outlet and a heating device for warming air in the housing, the improvement comprising a micro glass fibre fleece disposed in the housing between the air inlet and the fan, and a sterilizer lamp located closely adjacent to said fleece and directed to radiate sterilizing rays onto said fleece.

4,087,926

DRYING APPARATUS FOR PHOTO PRINTS AND THE LIKE

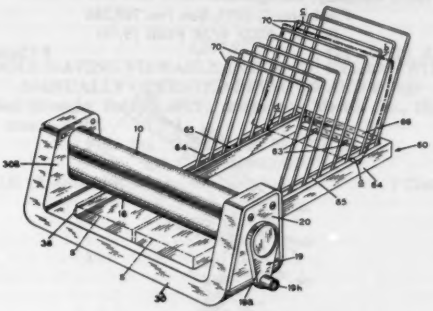
Steven M. Breslau, Cranford; Morris Gary Grossman, Wyckoff, both of N.J., and Edward D. Levy, Spring Valley, N.Y., assignors to Falcon Safety Products, Inc., Mountainside, N.J.

Filed Jul. 1, 1976, Ser. No. 701,626

Int. Cl.² F26B *19/00*

U.S. Cl. 34—70 **6 Claims**

1. A portable table top photo print drying apparatus comprising the combination of integrated disconnectable units, one unit being a squeeze unit and another being a rack unit, said squeeze unit comprising portable U-shaped supporting means molded from synthetic plastic material, said supporting means having a transverse portion adapted to be supported on a tabular surface and also having recessed portions upstanding from each end of said transverse portion, a pair of squeeze rolls parallel to said transverse portion, bearing means for said rolls mounted in said recessed portion of said U-shaped supporting means, crank means extending from one of said end portions of rotating said rolls, said rack means comprising a rectangular base member molded from synthetic plastic material extending in substantially coplanar relation to the transverse portion of said squeeze unit and adapted to be supported on said horizontal tabular surface, spaced wire-like members extending up from said base member in parallel relationship for supporting



prints issued from said squeeze rolls, and quick disconnectable means molded integrally with said units connecting one edge of said rack unit to one edge of said squeeze unit.

4,087,927

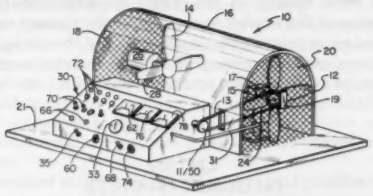
WIND POWER DEMONSTRATION APPARATUS

Vahan V. Basmajian, Billerica, Mass., assignor to Megatech Corporation, Billerica, Mass.

Filed Feb. 22, 1977, Ser. No. 770,906

Int. Cl.² G09B *25/00*; F03D *9/00*

U.S. Cl. 35—13 **7 Claims**



1. Wind power demonstration apparatus comprising,

means defining a driven wheel for rotating in response to impingement of a driving wind thereon,

the wheel construction comprising a driven propeller,

means defining a shroud for enclosing the driven wheel having apertured ends for allowing air to flow through said shroud while restricting access to said propeller,

means defining a wind generator within the shroud for blowing wind against the blades,

said wind generator comprising a driving propeller,

said apparatus having an electrical generator mechanically coupled to said driven propeller,

means defining a control instrument chassis mounting a generator load circuit therein electrically coupled to said electrical generator,

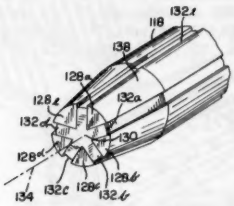
means for mounting the driven wheel, wind generator and shroud from said chassis,

means defining at least one generator output measuring instrument coupled to said electrical generator mounted on said chassis and having a viewable display for displaying the generator output.

4,087,928
MULTI-SECTIONAL RESILIENT RETAINER FOR EXCAVATING TOOTH

Donald J. Mickus, Chicago, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Apr. 7, 1977, Ser. No. 785,386
Int. Cl.[2] E02F *9/28;* F16B *19/00*
U.S. Cl. 37—142 A 9 Claims



1. In a digging tooth comprising a support member, a work tool having a socket and receiving therein a forward end of said support member, and a retainer pin in reception in bores formed, with respect to the thus received retainer, at aligned central and end points, respectively, through said support member and said work tool which thus carry the retainer, the improvement characterized wherein the retainer pin comprises:

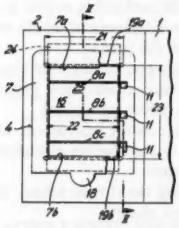
a unitary multi-sectional expanding retainer with an elastomeric element sandwiched in among metal sections thereof, said elastomeric element comprising at least three in number of angularly offset sections of predetermined radial extent substantially terminating at angularly and substantially equally peripherally spaced apart side portions of said retainer, said elastomeric sections converging from said side portions toward a central longitudinal axis of said retainer, and joining each other centrally of said retainer to form included angle slot means;

said metal sections of the unitary multi-sectional retainer being of like number to the elastomeric element sections, and being unitarily permanently bonded thereto and complementarily occupying all of said included angle slot means so as to form a permanent one-piece body for individual handling.

4,087,929
JALOUSIE STRUCTURE

Walther Rüger, Munich, Germany, assignor to Refeka Werbemittel GmbH, Heimstetten, Germany

Filed May 10, 1976, Ser. No. 684,729
Claims priority, application Germany, Apr. 5, 1976, 7610543[U]
Int. Cl.[2] G09F *11/00*
U.S. Cl. 40—488 16 Claims



1. A jalousie card exhibiting a jalousie in front of a display on a card, which comprises:

a punched member having a peripheral frame, said peripheral frame having parallel inner side edges;

a plurality of lamellaes pivotally mounted within said peripheral frame, said lamellaes being connected and parallel to each other;

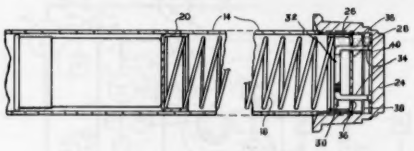
a display card having a display area defined by a pair of slots spaced apart, in proximity to said lamellaes and parallel to the inner side edges of said peripheral frame, said punched member attached to said display area of the card, said lamellaes adapted to pivotally move from a closed said display area, wherein said lamellaes are perpendicular to the display area, being parallel to the side edges of the display card and pivotally supported on said peripheral frame, pivoting about a central axis parallel to the side edges of the display card; and

a changeable display sheet for insertion through said pair of slots into the display card for close engagement therewith.

4,087,930
MAGAZINE CAP RETAINING MEANS FOR TUBULAR MAGAZINE FIREARMS

William H. Grehl, Wallingford, Conn., assignor to O. F. Mossberg & Sons, Inc., North Haven, Conn.

Filed Oct. 20, 1976, Ser. No. 734,294
Int. Cl.[2] F41C *27/00, 25/08*
U.S. Cl. 42—75 B 3 Claims



1. In a firearm having a magazine tube, a magazine spring for urging cartridges in said magazine tube toward one end thereof and a magazine cap threaded to and closing the other end of said tube, a detent device for restraining said magazine cap against loosening on said tube comprising

an apertured spring-retainer fixed within said tube at said other end for retaining said magazine spring,

a detent member having a base portion with at least one finger projecting therefrom, said base portion being disposed between said magazine spring and said retainer such that said magazine spring urges said detent member toward said retainer, said finger projecting through said apertured retainer into engagement with said magazine cap when said cap is threaded onto said tube, such that said cap forces said detent member against said magazine spring as said cap is tightened, said detent member being fixed against rotation by said spring-retainer, and

detent surface means associated with said cap and disposed for engagement by the free end of said finger, whereby said finger restrains said cap against accidental rotation.

4,087,931
ANIMATED TOY

Donald John Maurer, Torrance, Calif., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 26, 1976, Ser. No. 652,435
Int. Cl.[2] A63H *11/10*
U.S. Cl. 46—107 6 Claims

5. An animated toy comprising in combination:

a toy figurine adapted to be positioned in a belly down prone position, said figurine including a torso and first and second legs pivotally coupled to said torso;

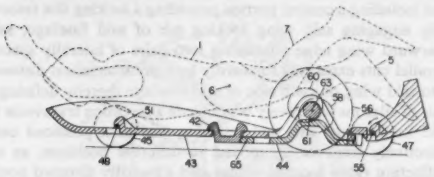
support means having an upper surface for carrying said figurine in a belly down prone position;

wheel means rotatably coupled to said support means for revolving responsive to movement of said support means

along a supporting surface with said wheel means in firm contact therewith;

leg pivoting means supported by said support means and engaging the front side of said figurine's legs for alternately pivoting each of said legs upwardly responsive to revolving of said wheel means whereby said legs pivot up and down to simulate a kick stroke when said support means is rolled along a supporting surface;

a first and second pair of carriage wheels for transporting said support means;



first axle means rotatably coupling said first pair of wheels to said support means at a location in front of said wheel means;

second axle means rotatably coupling said second pair of carriage wheels to said support means at a location behind said wheel means, said first and second pairs of wheels being arranged to support said support means on a supporting surface with said wheel means above and out of contact with said supporting surface; and

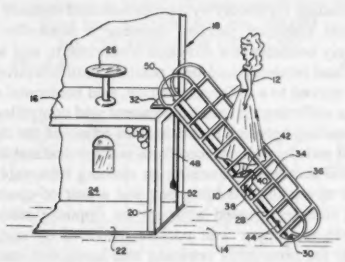
said support means possessing a flexibility characteristic responsive to downward pressure for lowering said wheel means into contact with said supporting surface.

4,087,932

TOY ESCALATOR

Janice Susannah Rosenthal, and Jurgis Sapkus, both of Manhattan Beach, Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Oct. 12, 1976, Ser. No. 731,643
Int. Cl.² A63H *33/30*
U.S. Cl. 46—40 **7 Claims**



1. In a toy escalator for use with a doll, the combination comprising:

a generally rectangular elongated base having a first end adapted for engaging a generally horizontal first surface and a second end adapted for engaging a second surface at a higher elevation than said first surface to position said base on an incline;

a pair of side members affixed to said base, each of said side members being disposed generally perpendicularly to the plane of the base along opposite edges thereof, each of said side members and said base being generally configured to provide a pair of opposing channels in proximity to the junction of the base with each of said side members;

a stair member slidably engaging said base, said stair member having projecting portions for engaging each of said channels;

means on said stair member adapted for engaging the doll to retain the doll in a generally upright position with said base on an incline; and

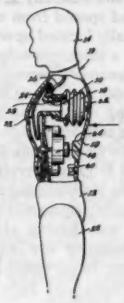
manually operable means coacting with said stair member and said second end of said base for controlling the movement of said stair member along said base.

4,087,933

DOLL HAVING VIEWABLE INTERNAL ORGANS WITH MANUALLY OPERATED BELLOWS AND PUMP

Ned Strongin, Baldwin, N.Y., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 21, 1977, Ser. No. 761,123
Int. Cl.² A63H *13/02*
U.S. Cl. 46—44 **7 Claims**



1. In a doll, the combination comprising:

a hollow torso member having a transparent front section through which the chest and stomach cavity may be viewed, said torso having an enlarged opening in the rear thereof;

a partition secured within said torso member, said partition dividing the torso interior into front and rear sections, said partition having an aperture therethrough;

a one-piece inflatable member configured to simulate pulsating chest organs, said inflatable member being positioned in to simulate front section of said torso and being secured to said partition by a portion thereof extending through said aperture;

bellows means in said rear section of said torso in fluid communication with said portion of said inflatable member;

transparent coiled tubing positioned on said partition in said front section of said torso and having the ends thereof in said rear section;

pump means mounted in said rear section in fluid communication with the ends of said tubing for passage therethrough of a fluid mixture; and

means within said enlarged opening of said torso for simultaneously actuating said bellows means and said pump means whereby to simulate action of internal organs of the stomach and chest cavities.

4,087,934

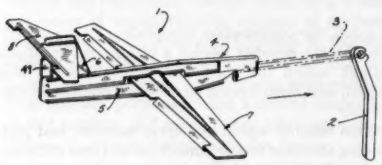
GLIDER

Thomas P. Gibson, W67N851 Washington, Cedarburg, Wis. 53012

Filed Jan. 10, 1977, Ser. No. 757,896
Int. Cl.² A63H *27/14*
U.S. Cl. 46—81 **5 Claims**

5. A hand launch glider, comprising a first integral plastic type element including a fuselage with an elongated body portion having a longitudinal axis substantially parallel to the direction of flight and including a sheet-like web with a first predetermined thickness in a direction transverse to said longitudinal axis and first, second and third vertically spaced

strengthening ribs longitudinally extending from a point adjacent a nose end of said fuselage to a point adjacent a tail end of said fuselage and having a second predetermined thickness greater than said first thickness in a direction transverse to said longitudinal axis, said first rib located along an upper edge of said body portion, said second rib located along a lower edge of said body portion, and said third rib centrally located within said body portion and connected to said first and second ribs through said sheet-like web, said nose end having a thickness greater than said first thickness and substantially equal to said second thickness in a direction transverse to said longitudinal axis thereby providing weight to said nose end to improve flying capability, and a notch located between said second strengthening rib and said third thickness for removable engagement with a launcher, said fuselage body portion including an axially extending slot located above and immediately adjacent said third rib and centrally in the longitudinal direction of said fuselage and spaced from said nose and tail ends, said slot having a centrally located upwardly directed notch, a reinforcing rib having a thickness substantially equal to said second thickness and located adjacent said slot and engaging said third rib so that said reinforcing and third ribs surround said slot, said reinforcing rib abutting a forward edge of said slot and spaced from a rearward edge of said slot through a portion of said sheet-like web forming a wing locking tab, said upper slot edge spaced from said reinforcing rib by another portion of said sheet-like web forming a wing securing web, a vertical stabilizer extending upwardly from said tail end and including a sheet-like web having a thickness substantially equal to said first thickness and an upwardly extending strengthening rib having an upwardly diminishing thickness



located along the forward edge of said vertical stabilizer and engaging said first longitudinally extending strengthening rib provided by said fuselage, an axially extending stabilizer slot located at an upper portion of said vertical stabilizer having a first end spaced adjacent to said upwardly extending rib through a portion of said sheet-like web forming a stabilizer locking tab and a second open end permitting external access, said longitudinal side edges of said stabilizer slot containing fourth and fifth substantially parallel strengthening ribs having a thickness substantially equal to said second thickness with said fourth rib located along the upper portion of said stabilizer slot and spaced from an upper edge of said vertical stabilizer through an upper portion of said web thereby permitting the unrestrained fourth rib and upper web portion to be selectively bent in a direction transverse to said longitudinal axis, said fifth rib located along the lower portion of said stabilizer slot and including an upwardly extending peg located on a rearward end of said fifth rib and spaced rearwardly from said fourth rib and upper web portion, a diagonal reinforcing rib having a third predetermined thickness greater than said first thickness and less than said second thickness and extending from a point adjacent the intersection of said upwardly extending rib and said first rib to a rearward portion of said fifth rib and a second upwardly extending rib having a thickness substantially equal to said third thickness and extending from a rearward portion of said first rib to an upward portion of said diagonal rib and spaced from a rear edge of said vertical stabilizer by a rear portion of said web, said rear web portion having first and second vertically spaced cuts extending in a axial direction from said rear edge to said second upwardly extending rib and defining a rudder therebetween and selectively bendable in a direction transverse to said longitudinal axis and retaining said bent position until selectively transversely moved to a different position, a second integral plastic type element forming a wing removably retained within said fuselage slot and including a sheet-like web having a substantially flat bottom surface and a thickness substantially equal to said first thickness, said wing providing a forward edge having a central portion snugly engaging said reinforcing rib at the forward edge of said fuselage slot and diverging rearwardly toward the outer extremities of said wing to form a swept-wing conifguration and a rearward edge located substantially normal to said fuselage and including a central portion providing a locking slot removably engaging said wing locking tab of said fuselage, said rearward wing edge containing two pairs of laterally spaced parallel cuts extending forwardly by a predetermined distance into said wing on each side of said fuselage thereby defining a pair of ailerons selectively bendable in a direction transverse to said longitudinal axis and retaining said bent positions until selectively transversely moved to different positions, an air deflecting ridge located within said upwardly directed notch provided by said fuselage slot and extending substantially between the oppositely disposed outer wing extremities at an upper wing surface and located substantially centrally between said forward and rear wing edges and substantially parallel with said forward wing edge, said air deflecting ridge having a forwardly facing slope of approximately 30° and a rearwardly facing slope of approximately 60° for permitting a desired flight characteristic, said upper wing surface containing a pair of upwardly extending dimples located between said air deflecting ridge and forward wing edge and spaced transversely to said longitudinal axis on opposite sides of said fuselage and removably retaining said wing securing web; and a third integral plastic type element forming a horizontal stabilizer removably retained by said vertical stabilizer and including a sheet-like web having a thickness substantially equal to said first thickness and a forward edge with a central portion containing a locking slot removably engaging said stabilizer locking tab of said vertical stabilizer and diverging rearwardly toward the outer extremities of said horizontal stabilizer to form a swept-stabilizer configuration and a rearward edge located substantially normal to said vertical stabilizer, said rearward horizontal stabilizer edge containing a pair of laterally spaced parallel cuts extending forwardly by a predetermined distance into said horizontal stabilizer thereby defining a controlled surface selectively bendable in a direction transverse to said longitudinal axis and retaining said bent position until selectively transversely moved to a different position, said horizontal stabilizer having a stiffening rib located adjacent said controlled surface and extending between points located adjacent the oppositely disposed ends laterally spaced from said vertical stabilizer, said horizontal stabilizer containing an opening removably engaging said upwardly extending peg and a pair of upwardly extending dimples located adjacent on opposite sides of said fourth rib and upper web portion provided by said vertical stabilizer for removably retaining said horizontal stabilizer.

4,087,935

TOY VEHICLE WITH HOUSING

Russell Curtis Edmisson, Manhattan Beach; Herbert May, Torrance, and Raymond Marie St. Pierre, Hawthorne, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Nov. 26, 1976, Ser. No. 745,107

Int. Cl.[2] A63H *17/14, 29/20*

U.S. Cl. 46—202 **7 Claims**

1. In a toy, the combination comprising:

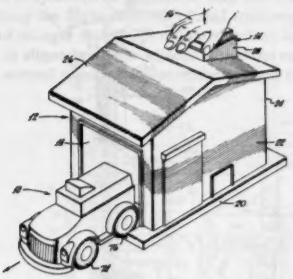
a toy vehicle having an inertia motor and a wheel driven thereby;

a drive gear within said vehicle coupled to said motor;

a housing having a portion thereof configured to support said vehicle;

a rack operatively connected within said housing for actuation between a first and second positions;

a pinion rotatably mounted within said housing and operable by said rack;
a large diameter drum secured to said pinion;
a power gear rotatably mounted within said housing adjacent the vehicle supporting portion;
a small diameter drum secured for rotation with said power gear;
strap means interconnecting said large diameter drum and said small diameter drum;



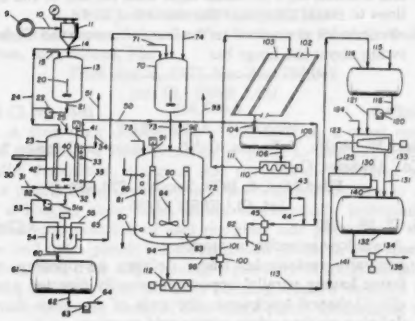
means within said housing adjacent said vehicle supporting portion for at least partially restraining said vehicle during actuation of said rack to maintain said drive gear in engagement with said power gear; and
bias means within said housing for retaining said rack in said first position and permitting movement of said rack to said second position against the force of said bias means whereby movement of said rack from said first to said second position rotates said power gear to energize the inertia motor and stoppage of rotation of said power gear causes the vehicle to leave said housing.

4,087,936

PROCESS FOR PRODUCTION OF ALGA BIOPOLYMER AND BIOMASS

Joseph George Savins, and Maynard L. Anderson, both of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 13, 1976, Ser. No. 750,089
Int. Cl.[2] A01G 7/00; C02C 1/00
U.S. Cl. 47—1.4 24 Claims



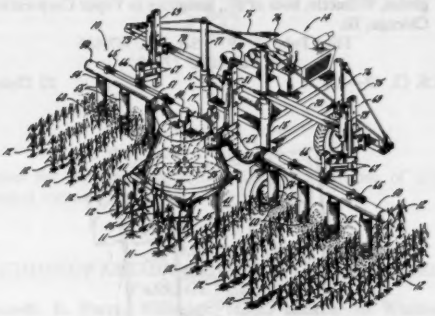
1. A process for the production of alga biopolymer and alga biomass comprising as a first step subjecting, in a seed reactor in the presence of a mixture of carbon dioxide and air, an aqueous culture containing an inoculum of alga and nutrients required for the growth of said alga to the action of artificial illumination of an intensity and for such a time to initiate growth of said alga, transferring at least a portion of said alga culture from said seed reactor to a main reactor, as a second step subjecting, in said main reactor in the presence of a mixture of carbon dioxide and air, an aqueous culture containing said alga and nutrients required for the growth of said alga to the reaction of artificial illumination of an intensity and for such a time to effect growth of alga biomass and concomitantly synthesis of alga biopolymer, and during said first and second steps manipulating the linear gradient of the cumulative absorbed radiant energy from the illumination versus time curve over the initial period of $0 < t < 2$ days, ψ_a, the cumulative absorbed moles of radiant energy quanta from the illumination, $(E_a)_c$, and the ratio $\psi_a/(E_a)_c$.

4,087,937

APPARATUS FOR POLLENATING PLANTS

Lawrence Dean Meador, R.R. 2, Lanark, Ill. 61046

Filed Jun. 30, 1977, Ser. No. 811,626
Int. Cl.[2] A01G 7/00
U.S. Cl. 47—1.41 18 Claims



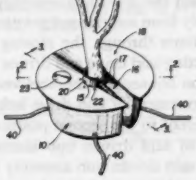
1. Apparatus for transferring pollen from a first row of plants to second and third rows of plants located on opposite sides of said first row, said apparatus comprising a shroud adapted for attachment to a vehicle and defining a downwardly opening chamber, said chamber overlying said first row as said vehicle moves along said rows, downwardly opening conduits located on opposite sides of said shroud and positioned adjacent said second and third rows, means establishing communication between said conduits and said chamber, and means for sucking pollen upwardly from said first row and into said chamber and for blowing such pollen through said conduits and downwardly onto said second and third rows.

4,087,938

TREE WATERING DEVICE

James Preston Koch, Rte. 8, Box 268-A, Yakima, Wash. 98908

Filed Mar. 21, 1977, Ser. No. 779,898
Int. Cl.[2] A01G 29/00
U.S. Cl. 47—48.5 6 Claims



1. A tree watering device comprising a watering tub of substantially annular form adapted to rest on the ground at the base of a tree in surrounding relationship to the tree trunk, said tub having a generally radial slot extending from top to bottom thereof by means of which said tub may be placed around a tree trunk, adjustable water metering valve means on said tub near its bottom by means of which water can be delivered at a

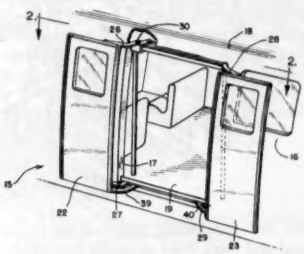
controlled rate to selected tree root areas, said tub having a bottom wall and an upwardly flaring side wall and a center upstanding sleeve rising from the bottom wall of the annular tub, a pair of radial substantially vertical walls joining the tub side wall with said center sleeve and defining therewith a generally radial slot, a concave lid resting on the open top of said tub and having a center opening adapted to fit over and surround said sleeve and a radial slot adapted to register with the tub radial slot, said tub being colored black to absorb heat and said lid and upstanding sleeve being white and reflective.

4,087,939

DOOR OPERATOR WITH LOCKING MECHANISM

Samir Mostafa Elguindy, Mount Prospect, and Kristupas Daugirdas, Wilmette, both of Ill., assignors to Vapor Corporation, Chicago, Ill.

Filed Feb. 11, 1977, Ser. No. 767,686
Int. Cl.² E05F *17/00*
U.S. Cl. 49—118 **22 Claims**



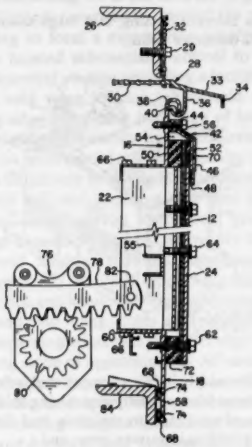
16. A power open spring return door operator for controlling the opening and closing of a pair of doors relative an opening in a vehicle, said operator comprising a base plate secured to the vehicle, parallel main and auxiliary shafts extending from the base plate, drive and driven hub assemblies rotatably mounted on said main shaft and movable between first and second positions to drive the doors through opening and closing cycles, a locking hub assembly rotatably mounted on the auxiliary shaft and movable between lock and unlock positions to lock the door in closed position, means connecting said driven hub assembly to said doors whereby driving said driven hub assembly between said first and second positions causes said door to move between closed and open positions, power means mounted on said base and drivingly connected to said drive hub assembly for driving said driven hub assembly from said first position to said second position to drive the door through the opening cycle, a spring connected between the base plate and the drive hub assembly for driving said driven hub assembly from said second position to said first position to drive the doors through the closing cycle, means drivingly interconnecting said drive and driven hub assemblies to define a lost motion connection therebetween whereby a portion of the total movement of said drive hub assembly from the first position thereof to the second position thereof will not cause movement of said driven hub assembly, a locking member secured on said driven hub assembly coacting with said locking hub assembly to lock the doors in closed position while allowing limited movement of the doors against the action of the spring toward open position, and means on the driven hub assembly for driving said locking hub assembly to unlock position during the take-up in the lost motion connection at the initiation of the opening cycle and to allow said locking hub assembly to move to lock position at the completion of the closing cycle.

4,087,940

TOP HINGED SASH ASSEMBLY

William P. Voegele, Jr., 8308 Post Rd., Allison Park, Pa. 15101

Filed Jan. 5, 1977, Ser. No. 757,019
Int. Cl.² E05D *7/00*
U.S. Cl. 49—397 **17 Claims**



1. A top hung hinged sash construction comprising:

A. a hinge bar adapted for securement to a building girt and including a substantially J-shaped hinge rail depending downward therefrom;

B. a frame assembly comprising a head member, a sill member, two side members and spaced vertical mullions mounted between the head and the sill member and at least one panel all joined in substantially rectangular relationship, said head member including an upwardly extending leg terminating in a curved beaded head rail positioned in swinging engagement with the hinge rail, said mullions having a planar forward surface, a hub extending outward therefrom, said hub including oppositely extending arms parallel to and spaced from the forward surface to form channels therebetween to accommodate a side flashing member or a flat panel in positive interlocking relationship and mullion caps mounted to at least certain of the mullions to retain the panel therebetween; and

C. an operator connected to the frame to cause the frame to swing about the hinge bar.

4,087,941

WINDOW ASSEMBLY

Robert W. Wolfe, Fullerton, Calif., assignor to Coleman Mfg. Co., Anaheim, Calif.

Filed Mar. 4, 1977, Ser. No. 774,438
Int. Cl.² E05D *13/06*
U.S. Cl. 49—450 **3 Claims**

1. A window assembly comprising:

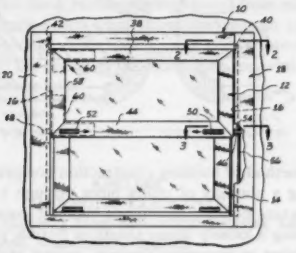
a generally rectangular frame defining an opening, said frame having parallel opposing inwardly directed generally U-shaped trackways, the ends of the arms thereof defining guiding edges within said opening;

a generally rectangular window sash having first, second, third and fourth window sash members with each of said window sash members having a generally rectangular hollow cross section interconnected at the corners by substantially identical angle members with said first and second members in parallel with an overall dimension between the edges thereof slightly smaller than the spacing between said guiding edges, each of the angle members being generally L-shaped and having a first leg and a second leg with each of said legs having a general cross

section adapted for insertion within the hollow members, the angle member having a channel formed within at least one of the legs and slot means in the outer wall of the other leg in alignment with said channel;

a pair of pivot projection members, each having a body portion insertible within said slot means for retention thereby and a pivot projection, said pivot projection members being secured to one end of said first and second window sash members with the outwardly extending pivot projections in alignment with the free ends thereof abutting the bight portions of said trackways;

a pair of plunger assemblies mounted within said angle members in aligned relation adjacent the other ends of said first and second window sash members, each of said plunger



assemblies having a spring-biased plunger slidably mounted within the channel of said at least one leg of said angle member with said plunger having a projection extending through said slot means of said angle member and outwardly from said window sash; and

a plurality of pairs of aligned apertures formed in the bight portions of said trackways for selective engagement by said plunger projections for latching said sash within said frame, said fixed pivot projections and said plunger projections being aligned and configured to engage the bight portions of said trackways to enable said sash to slide within said trackways with said guiding edges in spaced proximate relation to said first and second window sash members, said plunger projections being retractable to enable said sash to be removed.

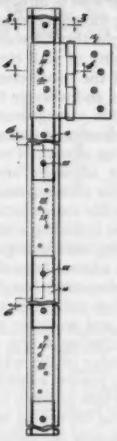
4,087,942

STEEL DOOR CONSTRUCTION

Frank P. Herrmann, Miramar, Fla., assignor to Precision Industries, Inc., Miami, Fla.

Filed Apr. 4, 1977, Ser. No. 784,041
Int. Cl.² E06B *3/00*
U.S. Cl. 49—501 **6 Claims**

1. A steel door comprising, in combination, a sheet metal inner panel and a sheet metal outer panel in mutually-spaced parallel disposition, marginal side portions of said inner and outer panels being inwardly bent towards one another to define a hinging door edge, means mechanically interjoining terminal end portions of said marginal side portions of said inner and outer panels for securing said panels in said spaced relation, said door edge having a plurality of longitudinally-spaced, inwardly-bent portions defining shallow recesses for the reception, one each, of butt hinge plates for hanging the door, a bent sheet metal bracket member within the door behind each of said recesses and having screw retainer means for receiving butt hinge plate screws extending through apertures in bottom wall portions of said recesses, said marginal side portions of said inner and outer panels being bent to define, along the length of the door, a central, outwardly-extending portion of rectangular cross-sectional configuration within which said shallow recesses are formed, said bent metal bracket member being U-shaped in cross-sectional configuration and having opposed outer side wall portions, longitudinal end portions of which are snugly received between the opposing side wall portions within the door as defined by said outwardly-extending portion along the length of the door, and



means for securing said longitudinal end portions of said bracket member to said hinging door edge.

4,087,943

METHOD OF ABRADING OR HAVING A RESTRICTED PASSAGE SURFACE

Kenneth E. Perry, Wellesley, Mass., assignor to Winfield Brooks Company, Woburn, Mass.

Division of Ser. No. 202,621, Nov. 26, 1971, abandoned. This application Sep. 27, 1973, Ser. No. 401,166
Int. Cl.² B24B *1/00*
U.S. Cl. 51—317 **1 Claim**

1. A method of abrading or polishing or honing or deburring a surface comprising flowing under pressure and at a high velocity through a restricted passage, a surface of which comprises said surface to be abraded, polished, honed or deburred, an abrasive composition comprising (1) a boron-dialkyl siloxane-oxygen polymer, (2) a gel modifier formed from a metallic soap of a fatty carboxylic acid having 8 to 22 carbon atoms and a hydrocarbon oil and (3) abrasive grit particles dispersed in said compound and gel modifier, said high velocity being achieved by pressure drop across said restricted passage.

4,087,944

MOVABLE PARTITION ARRANGEMENT

Günther Mecklenburg, Troisdorf, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Germany

Filed Aug. 5, 1974, Ser. No. 495,055
Claims priority, application Germany, Aug. 3, 1973, 2339334
Int. Cl.² E04B *2/32*
U.S. Cl. 52—241 **6 Claims**

1. A partition arrangement for use in a room, the arrangement comprising: a plurality of wall elements each having a pair of spaced lateral edges, each of said lateral edges being provided with a recess extending along the entire length thereof, mounting means for mounting said plurality of walls on a floor, lateral walls and a ceiling of the room, tubular coupling means disposed in said recesses for coupling adjacent

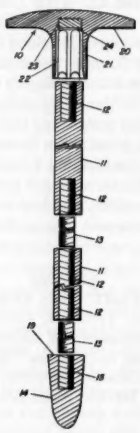
wall elements to each other in tension, said tubular coupling means including a tubular member arranged within said recesses so as to be completely independent of said mounting means and freely movable at least in directions toward and away from the floor and ceiling mounting means during an assembly and disassembly of the plurality of wall elements, said means for mounting said plurality of wall elements to the floor, lateral walls and ceiling of the room consists of a substantially U-shaped profile means, and wherein the partition arrangement is a double-wall partition arrangement, means are provided for fixedly securing each of a plurality of said wall elements to respective leg portions of each of said U-shaped profile means when said plurality of walls are in assembled condition wherein said means for securing said plurality of wall elements to said U-shaped profile means includes a profile metal sheet, said arrangement also including a baseboard means, and means for releasably securing said baseboard means to each of said wall elements along a lower edge thereof, wherein the height of each of said wall elements is less than the height of the room, and wherein a ceiling strip means is disposed between the ceiling of the room and an upper edge of the wall elements, said ceiling strip including a first surface portion extending between the upper edge of the wall elements and the ceiling and a second surface portion extending at substantially a right angle to said first surface portion, said first surface portion on one side thereof facing the ceiling being provided with at least one sealing lip contacting the ceiling of the room and on the other side thereof being provided with a rub means for maintaining said ceiling strip in position.

4,087,945

DRIVEN-TYPE SURVEY MONUMENT

Peter Berntsen, and Phillip R. Peterson, both of P.O. Box 3025, Madison, Wis. 53704

Filed Feb. 24, 1977, Ser. No. 771,559
Int. Cl.[2] E01F *9/02*
U.S. Cl. 52—103 **5 Claims**



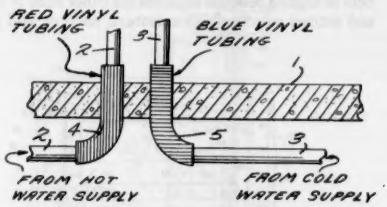
1. A driven-type survey monument comprising: a series of upright cylindrical rod sections having a longitudinal threaded bore in their upper and lower ends, threaded connectors turned into the threaded bores and capable of connecting the rods of said series in end-to-end tightly mated aligned relation, said rods being connected solely by said threaded connectors such that said series of rods is of uniform cross-section throughout the length of said series, a penetrating point attached at the lower end of the lowermost rod section by a threaded connector, and at least two generally longitudinal barbs radially spaced on the periphery of said penetrating point, said barbs having a biased turning surface for rotating said point and said series of rods connected thereto in a direction to tighten the threaded connections between said penetrating point and said lowermost rod and between all of said rods of the monument in response to downward driving of the point into the ground.

4,087,946

CONSTRUCTION METHODS

Robert H. Harris, 1900 Paula Dr., Jonesboro, Ark. 72401

Filed Mar. 28, 1977, Ser. No. 781,965
Int. Cl.[2] E04B *1/00, 5/48*
U.S. Cl. 52—105 **13 Claims**



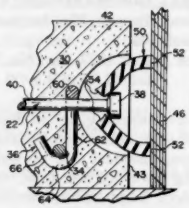
1. A method of building construction comprising
passing a plurality of utility pipes through a floor or wall structure defining an interior building space, and
disposing a loosely fitting sheath of flexible plastic material resistant to corrosive elements around each said pipe so that each sheath terminates shortly past the floor or wall in the interior building space, and completely surrounds and protects the pipe in the area extending through the floor or wall, and so that relative thermal expansion and contraction between the pipe and the floor or wall can take place without destructive effects on the pipe,
the sheaths being of different colors and the sheaths being disposed on a pipe indicating what utility is associated with that pipe.

4,087,947

EDGE-LIFTING SYSTEM FOR A CONCRETE SLAB

Norman G. Turner, Poway, Calif., assignor to Superior Concrete Accessories, Inc., San Diego, Calif.

Filed Sep. 15, 1976, Ser. No. 723,518
Int. Cl.[2] B25B *29/00*
U.S. Cl. 52—125 **2 Claims**



1. In a concrete slab form having a horizontal form base and an upstanding vertical form side, in combination, an anchor bolt supported from said form side in a horizontal position and at a level which corresponds approximately to the mid-level of the slab which is formed after wet concrete has been poured into the form, and having, in addition to a shank, an enlarged head spaced a comparatively small distance inwards of the form side, a semi-cylindrical, cup-shaped, recess-forming, pattern member having its circular rim secured to the form side, enveloping said head, and serving to support said bolt in its operative position as a preliminary to pouring of said wet concrete into the form, a horizontal linearly straight reinforcing rod disposed appreciably below the level of the anchor bolt and passing beneath said bolt so that the vertical planes of the

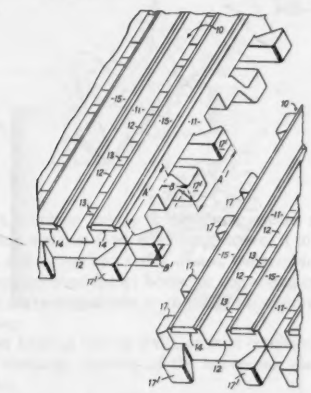
bolt and rod intersect each other at a right angle, and a hanger clip extending between the shank of the anchor bolt and the reinforcing rod and serving loosely to suspend the latter from the anchor bolt and at a level relatively close to the form base preparatory to pouring of said wet concrete into the form in order to produce said slab, said reinforcing rod serving in the completed slab when the anchor bolt is raised for slab-lifting purposes to impart a reaction force to the anchor bolt through the medium of the hanger clip, said hanger clip being in the form of a length of stiff rod stock bent at its mid-point to provide a saddle portion which seats on the shank of the anchor bolt and has downwardly extending outwardly diverging, coplanar, side legs, the lower end of each leg being provided with a reentrant bend which defines an upwardly facing divergent cradle-like hook portion within which the reinforcing rod is seated, the two hook portions being spaced from each other and, in combination with each other, defining an upwardly facing rod-receiving cradle, said hanger clip constituting the sole support for the region of the reinforcing rod which passes beneath the anchor bolt.

4,087,948

FLOORING ELEMENTS

Peter Gordon Mellor, Chapel-en-le-Frith, England, assignor to Ferodo Limited, Manchester, England

Filed Jan. 13, 1977, Ser. No. 759,119
Int. Cl.² B44D 5/08
U.S. Cl. 52—180 **10 Claims**



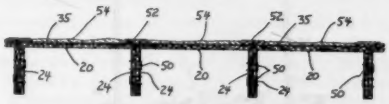
1. A flooring element comprising a body which is a single moulding having an upper layer of parallel elongated first bars and a lower layer of parallel elongated second bars, the first bars being disposed substantially at right angles to the second bars, the first bars being in spaced relationship to each other in said upper layer and the second bars being in spaced relationship to each other in said lower layer whereby said first and second bars together define a pattern of openings through the body, said first bars having a partially raised upper surface of material having a high coefficient of friction, said body further including at its edge a plurality of lugs extending therefrom at positions each corresponding to a respective aligned bar, said lugs being shaped to provide an undercut between the body and the remote end of the lug whereby the lugs of two flooring elements may be interengaged to interconnect the flooring elements, the width of the lugs being such that the width of a pair of interengaged lugs is no more than the width of the respective aligned bar, whereby the pattern of openings is maintained by the interengaged lugs.

4,087,949

BUILDING OF IMPROVED CARDBOARD PANEL CONSTRUCTION

Donald E. Hill, 2308 Meadowvale Dr., NE., Atlanta, Ga. 30345

Filed Dec. 27, 1976, Ser. No. 754,533
Int. Cl.² E04C 1/00
U.S. Cl. 52—309.13 **4 Claims**



1. A building comprising cardboard wall panels having a vertical, generally planar central section overlaid on the outside with a layer of fiberglass having tensile strength of a preselected magnitude from which central section two vertical side sections extend at substantially right angles to present two mutually confronting wall panel surfaces; and cardboard roof panels supported above said wall panels having a generally planar central section overlaid with a layer of fiberglass having tensile strength substantially in excess of said preselected magnitude from which central section two vertical side sections depend, to present two mutually confronting roof panel surfaces; and wherein the confronting surfaces of said wall panel vertical side sections are overlaid with layers of fiberglass having tensil strength approximating said preselected magnitude.

4,087,950

TRANSOM OR LIKE FIXED SASH WINDOW WITH IMPROVED MOUNTING MEANS

Mitsuo Nagase, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Jan. 17, 1977, Ser. No. 760,096
Claims priority, application Japan, Jan. 21, 1976, 51-6097
Int. Cl.² E04B 1/62
U.S. Cl. 52—397 **5 Claims**

1. A fixed sash window comprising, in combination:

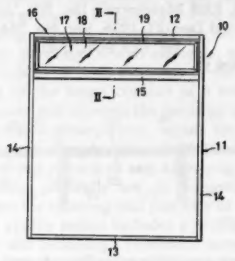
(a) a generally rectangular outer frame of metal having inwardly opening grooves formed therein, said outer frame including a header, a sill and two jambs one of which has a recess extending longitudinally along one of the inside edges thereof;

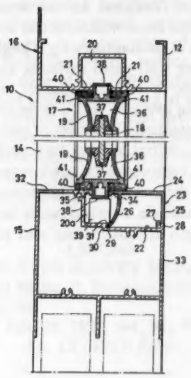
(b) a batten fixedly mounted in and extending along said recess whereby the adjacent inwardly opening groove is defined in part by said batten;

(c) a sash including a panel peripherally surrounded by a continuous sealing strip carried in a rigid inner frame of metal extending along and embracing the periphery of said sealing strip, said inner frame corresponding in shape to, but being smaller than, the space bounded by said outer frame and disposed therein, whereby gaps are created therebetween, said inner frame having tongues of metal projecting outwardly therefrom across said gaps and received in said inwardly opening grooves, respectively, of said metal outer frame in metal-to-metal engagement; and

(d) sealing means disposed in said gaps between said outer

frame and said inner frame at at least one side of said tongues for weather-tightly sealing the window and for





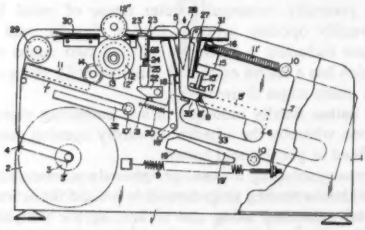
making said inner frame immovable with respect to said outer frame.

4,087,951

BINDING DEVICE FOR FASTENING THE OPENINGS OF BAGS OR THE LIKE

Kiichi Tsuda, 2-1981-50, Naka Tomigaoka, Nara City, and Fumiko Tange, 39-231, Aza Takane, Oaza Okehazama, Arimatsu-cho, Midari-ku Nagoya City, both of Japan

Filed Jan. 17, 1977, Ser. No. 759,869
Claims priority, application Japan, Sep. 2, 1976, 51-118323
Int. Cl.[2] B65B *57/08*
U.S. Cl. 53—198 A **3 Claims**



1. A binding device for twist-tying a bag opening with a wire-like binding cord, said device comprising:

a pair of spaced vertical sidewalls, said sidewalls having first L-shaped guide slots wide enough to receive said bag opening therein in the top sides thereof, the lower ends of said slots extending obliquely from the vertical portion of said L-shape,

binding cord supply means between said vertical walls for supplying binding cord to close said bag opening;

binding cord delivery means attached to the top side of said vertical walls between said walls and beside said first guide slots for delivering and cutting a predetermined length of binding cord from said binding cord supply means across said first guide slot;

a slider adjacent said first guide slot between said vertical walls and movable in response to the movement of said bag in said first guide slot;

binding cord twisting means on said slider and positioned adjacent said obliquely extending portion of said first guide slot for contacting and twisting said binding cord about said bag opening in said first guide slot during movement of said slider with said bag therein; and

a rack and action cam means at the front portion of said slider and connected to said binding cord delivery means in conjunction with the movement of said slider to feed and cut a binding cord,

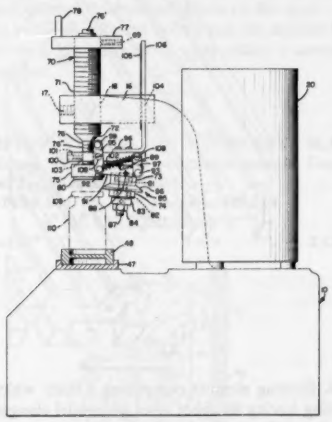
whereby when the open end of said bag is inserted into said first guide slot and moved therealong, a length of binding cord is twisted therearound by said binding cord twisting means moved in cooperation with the movement of said slider.

4,087,952

CRIMPING MECHANISM FOR AN ELECTRIC CAPPING MACHINE

Philip E. Spies, Baltimore, Md., assignor to National Instrument Company, Inc., Baltimore, Md.

Filed Aug. 13, 1976, Ser. No. 714,180
Int. Cl.[2] B65B *7/28;* B67B *3/18*
U.S. Cl. 53—334 **5 Claims**



1. In a capping machine for crimping the caps of containers, said capping machine having

a housing,

a container-receiving platform which is adapted to be rotated, raised and lowered, and

a crimping mechanism disposed above said platform and being operable to engage the cap of a container on the platform when the platform is raised and rotated,

said crimping mechanism including

a housing member having a downwardly tapering camming surface, and threadingly engaging said housing,

an abutment member mounted on a shaft within said housing member and axially displaceable with respect thereto,

a crimping head base connected with said shaft,

a crimping roller engageable with said cap, and

linkage means operatively connecting said crimping roller

with said crimping head base and including a cam follower member operable to engage the tapering camming surface of said housing member during axial movement of said abutment member,

the improvement comprising:

said housing member being provided with a rotatable adjusting wheel for rotating said housing member and thereby vertically displacing said abutment member relative to said container-receiving platform,

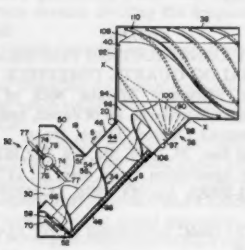
a bracket being affixed to said crimping head base and passing through a slot in said housing so as to prevent rotation of said crimping mechanism during the operation of said externally adjusting means, and said bracket being provided with an index scale for registering the position of said crimping head base relative to a prescribed location on said housing, whereby the machine can be quickly and easily adapted for use in crimping caps on containers of various sizes.

4,087,953

COMBINE CROP FEEDING SYSTEM

John Edward Wilson, Colona, Ill., and Edward John Hengen, Bettendorf, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Oct. 28, 1976, Ser. No. 736,440
Int. Cl.² A01D *41/06*
U.S. Cl. 56—14.6 **23 Claims**



1. In a combine having a harvesting means equipped to gather crop material from a field and deliver it to a discharge opening, and a crop processing means, the combination therewith of an improved feeder house for conveying crop material from the harvesting means to the crop processing means and comprising:

a feeder housing having walls, an inlet communicating with the discharge opening of the harvesting means, and an outlet;

a pair of bearing means carried rigidly by the housing;

a pair of side-by-side conveyor augers respectively rotatably mounted on said bearing means in cantilever fashion and extending within the housing so that in operation the augers are entirely supported by the bearing means and do not touch the housing walls, said walls surrounding the augers and including a plurality of continugous wall portions generally parallel to the auger axes, said wall portions variously and circumferentially converging towards and diverging from the auger peripheries and including top and bottom portions closely spaced from the augers so as to create a plurality of longitudinally extending spaces constituting feeding channels parallel and adjacent to the augers including channels above and below the augers in which crop material is confined and moved in a controlled conveying relationship by the augers; and

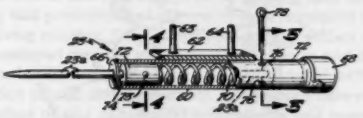
drive means operatively connected to the augers for rotating said augers in opposite directions so that crop material is conveyed along said feeding channels from the inlet to the outlet of the housing.

4,087,954

RETRACTABLE CROP GATHERING FINGER CONSTRUCTION

Arthur Reese, Sr., Rte. 2, Goodhue, Minn. 55027

Filed Jun. 11, 1976, Ser. No. 695,194
Int. Cl.² A01D *45/02*
U.S. Cl. 56—119 **1 Claim**



1. In combination with a corn harvesting implement movable along a path and having a plurality of forwardly extending corn heads adapted to move along a row of corn stalks to guide and direct corn stalks toward processing apparatus associated with said implement, a plurality of crop gathering finger apparatuses to lift corn stalks lying on the ground and which would otherwise be missed by said implement, each said finger apparatus comprising:

a rigid, tubular, elongated housing having foward and rearward ends and having a cylindrical inner chamber with a central longitudinal axis, said housing being fixed relative to and carried by a said corn head with said central axis being generally aligned with the path of travel of said implement;

a finger portion including a forwardly projecting pointed finger and a cylindrical plunger portion fixed relative to said finger and slidably, telescopically mounted in said inner chamber for movement along and substantially parallel to said axis between an extended position, wherein said finger extends forwardly, outwardly from said housing, and a retracted position, wherein said finger is wholly within said housing, said chamber and said plunger portion cooperating to guide said finger portion and maintain said finger portion generally parallel to said axis to prevent movement of said finger portion transverse to said axis;

spring means within said chamber and contacting said finger portion and said housing to bias said finger portion toward said extended position and to return said finger portion from a retracted position to an extended position, permitting said finger to move inwardly from extended position toward retracted position when said finger strikes an obstruction on the ground so as to avoid damage to said apparatus;

said housing being mounted to said harvesting implement so that said finger when in said extended position moves along and closely follows the ground so that said pointed finger will slip under corn stalks lying on the ground and raise such stalks so that said harvesting heads can receive and recover such corn stalks;

each said finger portion including a shoulder portion;

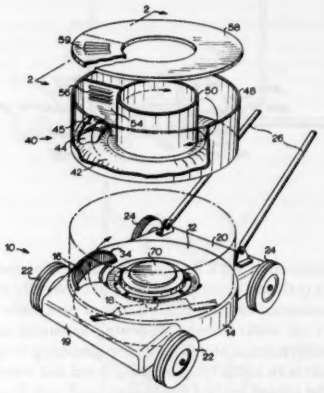
each said housing including a transverse pin aperture through said chamber and positioned forwardly of said shoulder portion when said finger portion is in said retracted position; and

each said finger apparatus further including a pin selectively, removably positioned in said pin aperture to keep said finger portion stored in said wholly retracted position when said finger is not needed for crop gathering.

4,087,955
ROTARY LAWN MOWER WITH IMPROVED GRASS COLLECTOR

Edward Szymanis, Midhurst, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Aug. 16, 1976, Ser. No. 714,975
Claims priority, application Canada, Aug. 21, 1975, 234103
Int. Cl.[2] A01D *35/22, 53/06*
U.S. Cl. 56—202 14 Claims



1. In a lawn mower including means for collecting grass cuttings, said lawn mower having a deck including a skirt downwardly dependent therefrom to enclose a cutting chamber, an electric motor mounted on said deck, vertical drive shaft means drivingly interconnected with said motor, a cutting blade mounted on said drive shaft for rotary movement in said chamber, said deck having an opening therein for the egress of grass cuttings from said mower, said mower including wheel means located adjacent four corners of said deck to support said deck for movement across a ground surface, the improvement wherein said means for collecting grass cuttings comprises a grass collector mounted on said deck to lay substantially within the wheel base of said wheel means, said grass collector having a base, walls upstanding from said base including an outer annular wall, an annular inner wall spaced from said outer wall said inner wall forming a conduit for the passage of cooling air to said motor and a baffle wall interconnecting said outer and inner walls, at least said outer, inner walls and said base being constructed from an air directing material, said collector having an opening in the base thereof adapted to be connected to said deck opening and lid means enclosing the space between said inner and outer walls.

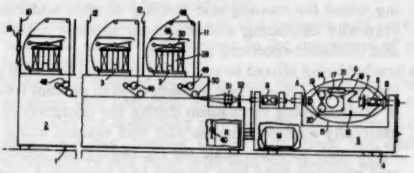
4,087,956
MACHINE FOR MANUFACTURE OF A CABLE FROM SINGLE WIRES

Michel Jean Gre, Bar-le-Duc, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Jul. 8, 1976, Ser. No. 703,561
Claims priority, application France, Jul. 23, 1975, 75 23228
Int. Cl.[2] D07B *3/00, 3/12*
U.S. Cl. 57—58.54 15 Claims

1. A machine for continuous stranding and cabling for the manufacture of a cable from single wires comprising

(A) a stranding battery including
a plurality of delivery spindles;
(B) double-twist cabling means including
a substantially horizontal spindle,
a fixed cradle,
a winding station on said fixed cradle, and
cabling guide means for guiding the cable along a double-twist path about said fixed cradle;
(C) traction means including first drive means engaging said strands and second drive means engaging the cable, and means for correlating the speeds thereof so that the speed of the first drive means is at least equal to the speed of the second drive means;

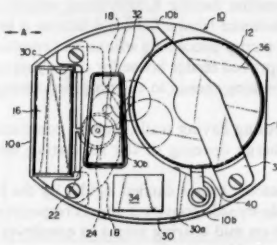


(D) a first twister intermediate said stranding battery and the inlet of said double-twisted cabling means; and
(E) overtwist means including a twister on said fixed cradle and positioned coaxially with said spindle to receive the cable from said cabling guide means.

4,087,957
MOVEMENT CONSTRUCTION FOR SMALL SIZE ANALOG QUARTZ TIMEPIECE

Kenzi Miyasaka; Mitsuhiro Murata, both of Tokyo, and Hiroyuki Uematsu, Kunitachi, all of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Dec. 20, 1976, Ser. No. 752,362
Claims priority, application Japan, Dec. 25, 1975, 50-159453; Feb. 24, 1976, 51-19083; Apr. 13, 1976, 51-45919[U]; Aug. 12, 1976, 51-96402
Int. Cl.[2] G04C *3/00;* G04B *29/02, 33/00*
U.S. Cl. 58—23 R 17 Claims

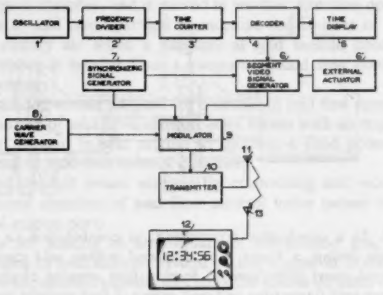


1. A movement construction for a small size analog quartz timepiece having a battery, a quartz crystal oscillator, an integrated circuit chip connected to said quartz crystal oscillator to provide a drive signal, an electro-mechanical transducer including a driving coil, stators and a rotor adapted to be driven in response to said drive signal, and a wheel train driven by said electro-mechanical transducer to actuate a time-indicating mechanism, comprising a base plate, a wheel support plate mounted on said base plate in a spaced relationship with respect thereto to accommodate therebetween said wheel train, and a circuit substrate spaced from said wheel support plate and having first and second cutouts formed in predetermined positions to provide spaces independent from each other in a horizontal plane to accommodate said driving coil and said battery, respectively.

4,087,958
TIMEPIECE APPARATUS

Heihachiro Ebihara, and Misao Uchino, both of Tokorozawa, Japan, assignors to Citizen Watch Company, Limited, Tokyo, Japan

Filed Jan. 24, 1977, Ser. No. 761,957
Claims priority, application Japan, Jan. 22, 1976, 51-6236
Int. Cl.[2] G04C *13/02, 13/04;* H04B *1/02;* H05B *39/09*
U.S. Cl. 58—25 10 Claims

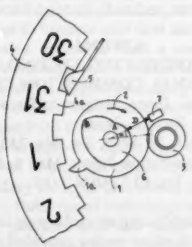


1. A timepiece apparatus for transmitting segment video signal comprising:
(1) an oscillator generating a time base signal,
(2) a frequency divider dividing the frequency of said time base signal,
(3) a time counter counting an output from said frequency divider,
(4) a decoder decoding an output from said time counter,
(5) a segment video signal generator controlled by means of said decoder,
(6) a synchronizing signal generator delivering a synchronizing signal to said segment video signal generator,
(7) a modulator receiving a segment video signal from said segment video signal generator and a synchronizing signal from said synchronizing signal generator,
(8) a carrier wave generator delivering a carrier wave to be modulated by said modulator, and
(9) a transmitter transmitting a modulated carrier wave from said modulator.

4,087,959
DRIVING MECHANISM OF A MEMBER OF TIMEPIECE MOVING INTERMITTENTLY

Claude Laesser, La Chaux-de-Fonds, Switzerland, assignor to Ebauches S.A., Switzerland

Filed Sep. 7, 1976, Ser. No. 720,666
Claims priority, application Switzerland, Sep. 9, 1975, 11690/75
Int. Cl.[2] G04B *15/00*
U.S. Cl. 58—116 M 1 Claim

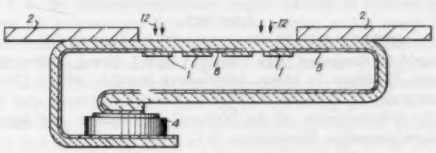


1. In a driving mechanism for a timepiece having gearing for continuously rotating a driving member in one direction, a driven member and means for moving said driven member intermittently in step-by-step fashion on rotation of said driving member, one step for each revolution of said driving member, whereby said driven member is moved only during a predetermined portion of each revolution of said driving member, the improvement comprising
a cam-shaped member rigid with said driving member for rotation therewith, said cam-shaped member being made of a soft magnetic material and
a stationary magnet mounted in spaced relation with respect to said cam-shaped member for cooperation therewith,
the profile of said cam-shaped member being such that during said predetermined portion of each revolution of said driving member, the distance between the surface of said camshaped member and magnet decreases as said driving member rotates, while during the remainder of each revolution of said driving member, the distance between the surface of said cam-shaped member and said magnet increases,
whereby the reluctance of the magnetic circuit constituted by said cam-shaped member and magnet varies in such a way that the torque applied to the driving member by the gearing of said timepiece is substantially constant throughout each revolution of said driving member.

4,087,960
SOLAR BATTERY WRISTWATCH

Oguchi Koichi, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Jun. 2, 1976, Ser. No. 692,070
Claims priority, application Japan, Jun. 2, 1975, 50-66151
Int. Cl.[2] G04C *3/00;* G04B *19/06*
U.S. Cl. 58—127 R 8 Claims



1. In a solar battery wristwatch including a solar battery, a dial plate, an electronic circuit and storage battery for storing energy generated by said solar battery, the improvement comprising a flexible printed-circuit assembly mounted on said dial plate, said assembly being in the form of a thin tape-shaped strip of electrically-insulating material, said strip having two ends, and including electrically-conductive leads for making electrical contacts among said solar battery, dial plate, electronic circuit and storage battery, at least one cell in said solar battery being bonded by a lead in said strip, said strip being mounted on said dial plate of said wristwatch, both ends of said strip being connected with said electronic circuit said dial plate and printed-circuit assembly being free of openings for transit of electrically-conductive leads therethrough.

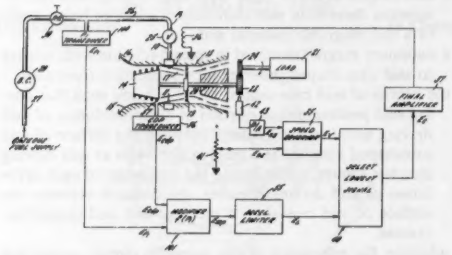
4,087,961
FUEL CONTROL SYSTEM FOR GAS TURBINE ENGINE OPERATED ON GASEOUS FUEL

Paul A. Avery, Fort Collins, Colo., assignor to Woodward Governor Company, Rockford, Ill.

Filed Jul. 21, 1976, Ser. No. 707,188
Int. Cl.[2] F02C *9/08*
U.S. Cl. 60—39.28 R 6 Claims

1. A control system for a gas turbine engine operated from a gaseous fuel supply, said system comprising fuel control valve means interposed between said supply and said engine, a governor coupled to said engine and operable to cause opening and closing displacement of said valve means to vary the rate of fuel flow to said engine, first means for detecting the compres-

sor discharge pressure of said engine, second means upstream of said valve means for detecting the pressure of the fuel supply to said valve means, and means acting independently of said governor and responsive to both said first and second means for limiting opening displacement of said valve means in



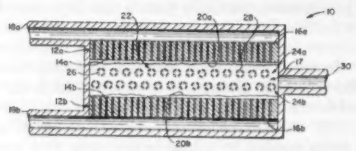
accordance with (i) a normal schedule established by changes in compressor discharge pressure when fuel supply pressure is at a normal predetermined value and (ii) different schedules established by changes in compressor discharge pressure when said fuel supply pressure is at different values other than said normal value.

4,087,962

DIRECT HEATING SURFACE COMBUSTOR

Donald G. Beremand, Bay Village; Lloyd I. Shure, Willowick, and Thaddeus S. Mroz, Middleburg Heights, all of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 26, 1976, Ser. No. 708,660
Int. Cl.[2] F02C 7/22; F23D 13/14
U.S. Cl. 60—39.65 **3 Claims**



1. A direct heating, gas turbine, surface combustor for producing a primary flow of gases with low-emission products, said combustor comprising:

first and second porous plate burners each having a first surface against which a fuel-air mixture is directed and a second, opposed surface for providing a combustion situs, said first and second burners being spaced apart to define a combustion chamber therebetween;

a radiant heat sink disposed within said combustion chamber in proximity to the said second surface of each of said first and second burners, said radiant heat sink including a first porous wall and a second porous wall generally parallel to said first porous wall, said first porous wall being disposed adjacent said first burner and said second porous wall being adjacent said second burner, and

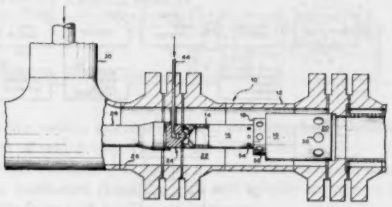
means for directing up to 100% of a secondary air flow through said heat sink to provide cooling thereof and dilution of combustor exhaust products.

4,087,963

COMBUSTOR FOR LOW-LEVEL NO_x AND CO EMISSIONS

Robert M. Schirmer, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 456,156, Mar. 29, 1974, abandoned.
This application Apr. 23, 1976, Ser. No. 679,545
Int. Cl.[2] F02C 3/00, 7/08
U.S. Cl. 60—39.23 **13 Claims**



1. In a combustor comprising, in combination, a tubular outer casing, a flame tube disposed within said casing and spaced apart therefrom to form a first annular chamber between said flame tube and said casing, a first air inlet means for introducing a first stream of air into the upstream end portion of said flame tube, and a fuel inlet means for introducing fuel into the upstream end portion of said flame tube, the improvements comprising, in combination:

a flame tube having an upstream primary combustion section of uniform cross-sectional area and having an essentially smooth internal wall surface, an intermediate secondary combustion section of greater cross-sectional area than said primary combustion section and having an essentially smooth internal wall surface, and a downstream quench or dilution section having an essentially smooth internal wall surface;

means for introducing air from the first annular chamber into said primary combustion section solely at a first station located adjacent the downstream end of said primary combustion chamber and adjacent the upstream end of the annular connecting section described hereinafter comprising at least one opening provided in the wall of said primary combustion section at said first station for admitting a second stream of air from said first annular chamber into the interior of said flame tube in a radial direction only; and

an annular connecting section of greater cross-sectional area than said primary combustion section joined in sealed engagement at its upstream end to the downstream end of said primary combustion section around the periphery thereof and joined in sealed engagement around the periphery of its downstream end to the upstream end of said secondary combustion section, and comprising the upstream end portion of said secondary combustion section, wherein air is prevented from entering into said connecting section other than in a radial direction.

4,087,964

SYSTEM FOR INTRODUCING SECONDARY AIR INTO AN INTERNAL COMBUSTION ENGINE

Hideo Miyagi, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 18, 1976, Ser. No. 733,167
Claims priority, application Japan, May 1, 1976, 51-049388
Int. Cl.[2] F01N 3/10
U.S. Cl. 60—276 **9 Claims**

1. A system for introducing secondary air into gas exhausted from an internal combustion engine provided with a three-way catalytic converter in the exhaust system of the engine, said system comprising:

pipe means for introducing secondary air into the engine;

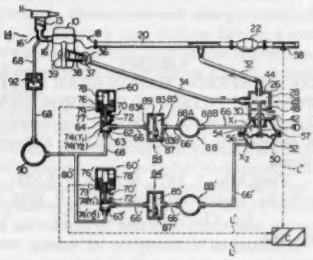
flow control valve means having a valve member arranged in said pipe means for controlling an amount of the secondary air introduced into the engine through said pipe means, and having a diaphragm which is connected to said valve member which is arranged across the interior thereof so as to form a first and a second control chamber on both sides of the diaphragm, said valve member is moved by said diaphragm in one direction to decrease the amount of the secondary air when a pressure at said first control chamber is smaller than a pressure at said second control chamber, and is moved in another direction opposite to said one direction to increase the amount of the secondary air when a pressure at said second control chamber is smaller than a pressure at said first control chamber;

first conduit means adapted for connecting said first control chamber of said flow control valve means with an engine port formed in said engine to transmit a fluid pressure signal to said first control chamber;

second conduit means adapted for connecting said second control chamber of said flow control valve means with said engine port;

means for sensing an atmosphere of the exhaust gas, arranged in said exhaust system of the engine in order to provide electric signals indicating the excess air ratio λ of the exhaust gas in the exhaust system,

first fluid signal switching valve means arranged in said first conduit means which has a first and a second position, in



said first position, said first control chamber of said flow control valve means being opened to said engine port for transmitting said fluid pressure signal to said first control chamber, and in said second position, said first control chamber being opened to an atmosphere to introduce atmospheric air into the first control chamber;

second fluid signal switching valve means arranged in said second conduit means which has a first and a second position, in said first position, said second control chamber of said flow control valve means being opened to said engine port to transmit said fluid pressure to said second chamber, in said second position, said second control chamber being opened to an atmosphere to introduce air into said second control chamber; and,

operating means to operate said first and second fluid signal switching valve means in such a manner that said first fluid signal switching valve means is in it's first position and said second fluid signal switching valve means is in it's said second position, when an electric signal indicating $\lambda > 1.0$ is transmitted from the sensing means to the operational means so that the diaphragm of said flow control valve is moved in said one direction allowing the amount of the secondary air to be decreased, and in such a manner that said first fluid signal switching valve means is in it's said second position and that said second fluid signal switching valve means is in it's first position, when another electric signal indicating $\lambda < 1.0$ is transmitted from the sensing means so that said diaphragm is moved in said other direction allowing an amount of the secondary air introduced into the engine to be increased, whereby said excess air ratio λ is controlled near 1.0.

4,087,965

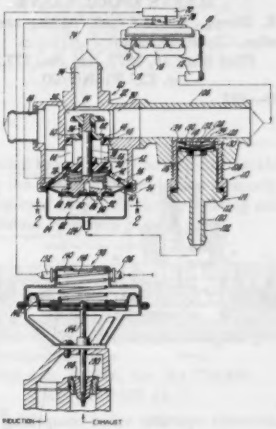
ENGINE CONTROL ASSEMBLY

William F. Thornburgh, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 9, 1976, Ser. No. 748,689

Int. Cl.[2] F01N *3/10*; F02M *25/06*

U.S. Cl. 60—277 **4 Claims**



1. In an internal combustion engine having an exhaust system for exhaust gas flow from the engine and a pump for delivering air to said exhaust system to support oxidation of exhaust gases therein: an engine control assembly comprising an element movable between advanced and retracted positions in response to at least one engine operating parameter for controlling engine operation in accordance with that parameter, and means responsive to the temperature of the air delivered by said pump for causing said element to move to said advanced position irrespective of said parameter to thereby enhance operation of the engine.

4,087,966

EXHAUST GAS CLEANING DEVICE

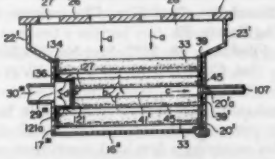
Hajime Akado, Kariya; Yutaka Kawashima, Okazaki; Akihide Yamaguchi, and Hideki Matsuura, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Division of Ser. No. 465,625, Apr. 30, 1974, Pat. No. 3,937,015. This application Dec. 10, 1975, Ser. No. 639,590

Claims priority, application Japan, May 3, 1973, 48-50130; Jun. 1, 1973, 48-62402; Jun. 8, 1973, 48-65231

Int. Cl.[2] F02M *25/06*

U.S. Cl. 60—278 **9 Claims**



1. An exhaust cleaning device comprising a body defining a space therein having at least one inlet port and an outlet port, an annular heat resistant filtering element having a filtering material which is corrugated in a circumferential direction so

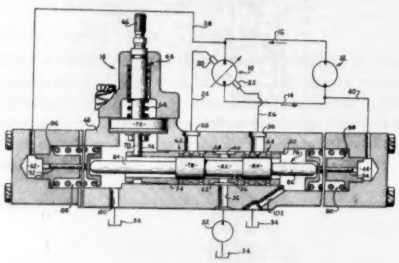
as to form a wall having a corrugated round cross-section, said wall dividing the space within the body into first and second spaces, said first space communicating with said at least one inlet port and said outlet port, said second space communicating with the suction side of an internal combustion engine through a by-pass pipe, said at least one inlet port being adapted to directly communicate with a corresponding exhaust port of said internal combustion engine.

4,087,967

SLEEVE SPOOL VALVE

Kenneth K. Knapp, Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 14, 1977, Ser. No. 777,256
Int. Cl.[2] F16B *9/00*
U.S. Cl. 60—392 **17 Claims**



1. A selectively operable valve comprising a body having two ports, a bore in said body communicating with said ports, a pair of concentrically nested valve elements movable within said bore and relative to each other for controlling fluid flow between said ports, one of said valve elements being a sleeve with an outer periphery in sliding engagement with said bore and an inner periphery, said sleeve having two axially spaced radially extending passages adapted for sequential communication with one of said body ports upon movement of said sleeve and an opening in communication with said other port and said inner periphery, said radially extending passages having different cross sectional areas to provide different degrees of fluid flow therethrough for a given fluid pressure, an annular groove on said inner periphery communicating with said radially extending passages, the other of said valve elements comprising a spool having a land in sliding engagement with said inner periphery and having an axial length sufficient to overlap said annular groove, means for displacing said sleeve relative to said body to establish communication between one of said radially extending passages in said sleeve with said one port, means to position said spool relative to said sleeve to establish communication between said annular groove and said other port.

4,087,968

FLOW CONTROL VALVE FOR COMBINING TWO DISSIMILAR INDEPENDENT SYSTEMS TO A COMMON PRESSURE SOURCE

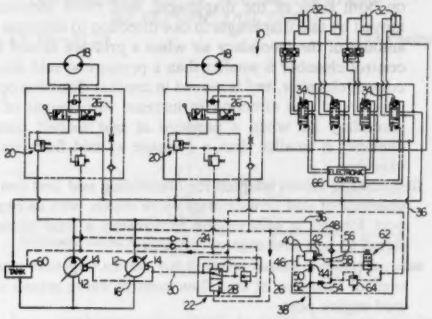
Donald L. Bianchetta, Coal City, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 28, 1977, Ser. No. 791,910
Int. Cl.[2] F15B *13/09*; F16H *39/46*
U.S. Cl. 60—445 **10 Claims**

1. In a hydraulic fluid system of a vehicle having variable displacement pump means serving first work element means and means for receiving a first load signal from said first work element means and controlling the discharge of the pump means in response to the first load signal; an improvement comprising:

a plurality of second work elements which receive fluid flow from said pump means via a common supply line connected to said first work element means, said fluid flow not passing via any individual load responsive delivery means; and

load responsive control means having flow restricting means in a signal line which communicates with the common supply line for sensing a load pressure in the common



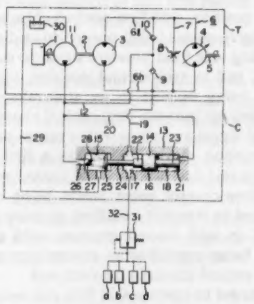
supply line, said load pressure being a maximum load pressure of any of said second work elements, and delivering a second load signal representative of the load pressure to combine with the first load signal to control the discharge of the pump means to be responsive to the larger of said first and second load signals.

4,087,969

HYDRAULIC SPEED CHANGE GEAR HAVING AN AUTOMATIC PRESSURE CONTROL DEVICE

Noriyuki Takahashi, Tokyo, and Masao Nishikawa, Niiza, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 7, 1977, Ser. No. 775,322
Claims priority, application Japan, Mar. 9, 1976, 51/25279
Int. Cl.[2] F15B *9/14, 11/16*
U.S. Cl. 60—464 **3 Claims**



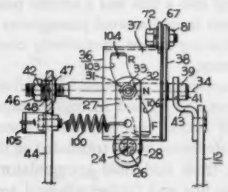
1. A hydraulic speed change gear comprising a fixed displacement hydraulic pump adapted to be driven by an input shaft, a variable displacement hydraulic motor having an output shaft, a closed hydraulic circuit connecting between said pump and said motor, a hydraulic supply pump drivably coupled to said input shaft, a supply passage connected with a discharge port of said supply pump and with said closed hydraulic circuit through check valves, and an oil pressure control device connected with said closed hydraulic circuit and said supply passage for reducing the oil pressure in said supply passage in proportion to a pressure rise in said closed hydraulic circuit.

4,087,970

HYDROSTATIC TRANSMISSION CONTROL

John J. Slazas, Cedarburg, and Arno Gunther, Port Washington, both of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation of Ser. No. 536,032, Dec. 23, 1974, abandoned.
This application Mar. 23, 1977, Ser. No. 780,544
Int. Cl.[2] F16D 39/00; F16H 25/08, 25/16
U.S. Cl. 60—487 2 Claims



1. In combination with a forward-reverse hydrostatic transmission having a drive pump with a swash plate tiltable about an axis to either side of a neutral position to vary the volume output of said pump, operating means for controlling the movement of said swash plate, said operating means comprising:

a swash plate control arm pivotable about a first axis and connected to said swash plate to cause tilting movement thereof upon pivotal movement of said arm,

a cam pivotable about a second axis perpendicular to said first axis including a cam surface having a neutral point and forward and reverse portions on opposite sides of said neutral point, said cam including a shaft disposed on said second axis,

support means carrying said shaft,

a cam follower on said control arm in spaced relation to said first axis and in engagement with said cam surface,

a shiftable manual control member, link means interconnecting said manual control member and said cam whereby shifting movement of said manual control member effects pivotal movement of said cam about said second axis and

adjustment means in cooperative engagement with said support means and shaft permitting axial adjustment of said shaft and cam relative to said support means, said adjustment means including relatively rotatable parts with cooperatively engaged threads coaxial with said shaft, said parts upon relative rotation being operable to effect said axial adjustment of said shaft to cause said cam follower to be disposed at said neutral point on said cam surface when said swash plate is in its neutral position.

4,087,971

DEVICES AND METHODS FOR CONVERTING HEAT ENERGY TO MECHANICAL ENERGY

William Barrie Hart, Ipswich, England, assignor to Delta Materials Research Limited, Ipswich, England

Filed Mar. 24, 1976, Ser. No. 669,966
Claims priority, application United Kingdom, Mar. 24, 1975, 12195/75
Int. Cl.[2] F03G 7/06
U.S. Cl. 60—527 22 Claims

1. A device for converting heat energy into mechanical energy comprising;

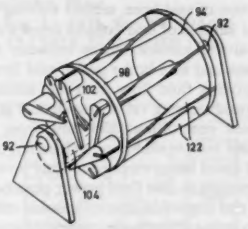
a first member and a second member, said first member comprising a plurality of thermally responsive elements arranged about an axis for relative rotation between the first and second members;

means rigidly mounting one end of each said elements in spaced relation about said axis;

means rotatably mounting the other end of each element;

means connected to said elements for mechanically deforming said elements in torsion;

thermal cycling means subjecting said elements to a thermal heating and cooling cycle for generating a cyclic torsional force in said elements in a predetermined phase relationship with the torsional deformation of said mechanical deformation means; and



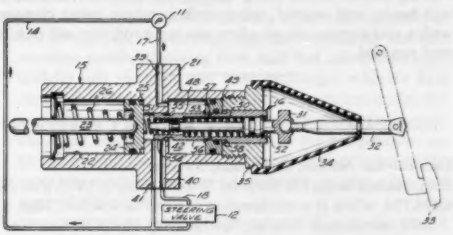
means connected to said other end of each said elements for converting the torsional forces in said elements to a continuous rotational output torque for rotating said first and second members relatively of each other.

4,087,972

BRAKE BOOSTER WITH SPRING TYPE RATIO CHANGER

Gary W. Scheffel, Kent, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Filed Aug. 2, 1976, Ser. No. 710,690
Int. Cl.[2] B60T 13/12
U.S. Cl. 60—548 5 Claims



1. In a motor vehicle, a fluid power circuit comprising a pump having an inlet side and an outlet side, a control valve, a steering valve having an inlet side and an outlet side, a brake booster, and conduit means hydraulically connecting said pump and control valve and steering valve and brake booster; said brake booster including a housing having a bore extending therethrough, said bore having a first end portion and a second end portion and a connecting portion between said end portions, said end portions each having a significantly larger diameter than said connecting portion, a power piston slidably disposed in said first end portion of said bore, a power chamber in said first end portion of said bore on one side of said power piston, an input rod slidably disposed in said second end portion of said bore on said one side of said power piston and having a first end and a second end, a brake pedal operatively connected to said first end of said input rod for axially moving said input rod in said bore between a deactuated position and an actuated position, a pump passage in said housing hydraulically connected to said pump outlet side and opening into said second end portion of said bore, a steering valve passage in said housing hydraulically connected to said steering valve inlet side and opening into said connecting portion of said bore adjacent said second end portion of said bore, a drain passage in said housing hydraulically connected to said pump inlet side and opening into said connecting portion of said bore adjacent said first end portion of said bore; said control valve including a control spool slidably disposed in said bore on said one side

of said power piston and having a first end and a second end, said control spool including an exterior surface, first valving surface means on said exterior surface of said control spool defining a fluid flow path extending from said second end portion of said bore to said steering valve passage in said connecting portion of said bore, second valving surface means on said exterior surface of said control spool axially spaced from said first valving surface means between said first valving surface means and said brake pedal, said first valving surface means controlling fluid flow from said second end portion of said bore to said steering valve passage and said second valving surface means controlling fluid flow from said second end portion of said bore to said power chamber, one of said ends of said control spool being exposed to fluid power chamber pressure and arranged so that fluid power chamber pressure acting on said one end urges said control spool in one direction in said bore, a ratio spring operatively connected to said input rod and to said control valve, said ratio spring being constructed and arranged to urge said control valve in a direction opposite said first direction when said input rod is actuated, and brake pedal travel control means including an annular sleeve slidably disposed in said second portion of said bore operatively associated with said control spool limiting the travel of said control spool and of said input rod and brake pedal to prevent excessive travel of said brake pedal under predetermined operating conditions, and said brake pedal travel control means being inoperative under all other operating conditions, said exterior surface of said control spool including a third valving surface means controlling fluid flow from said power chamber to said drain passage, said control spool including at least two lands each having opposite ends, said third valving surface means being one of said ends of one of said lands, said first and second valving surface means being said opposite ends of the other of said lands, said second valve surface means being disposed within said annular sleeve when said input rod is in said deactuated position.

4,087,973

UNBALANCED HYDRAULIC SYSTEM CAPABLE OF WORK

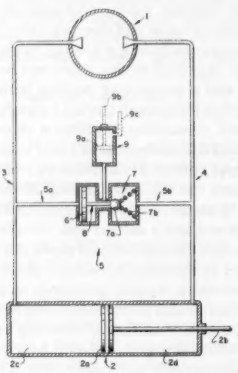
Lars-Gunnar Nordin, Stockholm, Sweden

Continuation-in-part of Ser. No. 584,441, Jun. 6, 1975, Pat. No. 4,024,714, which is a continuation of Ser. No. 450,538, Mar. 12, 1974, abandoned. This application May 10, 1977, Ser. No. 795,590

Claims priority, application Sweden, Mar. 12, 1973, 7303429

Int. Cl.[2] F15B *7/10*

U.S. Cl. 60—572 **1 Claim**



1. Hydraulic input-output device capable of translating a first movement of a certain magnitude into at least a second movement of a magnitude having a predetermined ratio to said first movement comprising in combination:

a. a drive fluid actuating mechanism;
b. a first drive fluid operated mechanism;
c. a first hydrostatic line operatively connecting said first and said second mechanisms;
d. a second hydrostatic line operatively connecting said first and said second mechanisms;
e. a passageway extending between said first and said second lines;
f. movable barrier means in said passageway separating said passageway into a first and a second passageway portion;
g. valve means in said second passageway portion;
h. valve actuating means operatively connected with said barrier means;
i. a fluid accumulator or a second drive fluid operated mechanism connected to said second passageway portion between said barrier and said valve means; wherein said volume differential being translated as fluid flow towards and away from said fluid accumulator via said second hydrostatic line and further via said second passageway portion and said valve means, said valve means being actuated by said barrier means to open passage to said accumulator by virtue of the area of said barrier means exposed to the first hydrostatic line pressure being greater than the area of said valve means exposed to the second hydrostatic line pressure.

4,087,974

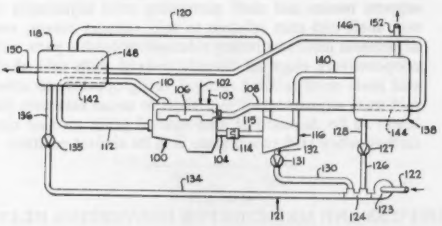
METHOD AND APPARATUS FOR GENERATING STEAM

Raymond C. Vaughan, 135 E. Main St., Hamburg, N.Y. 14075

Filed Feb. 5, 1976, Ser. No. 655,477

Int. Cl.[2] F01K *23/10*

U.S. Cl. 60—618 **23 Claims**



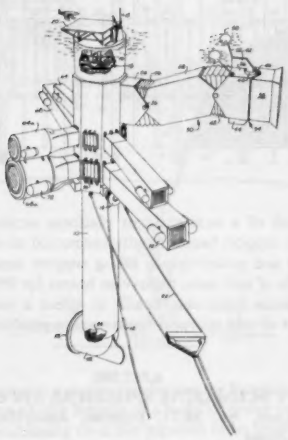
1. Apparatus for generating vapor such as steam comprising:
a. an internal combustion engine having a mechanical energy output and a waste heat output comprising heat from engine exhaust;
b. a compressor having an input and an output;
c. means for coupling the mechanical energy output of said engine to said compressor for driving said compressor;
d. a heat exchanger having an inlet in communication with a flow of liquid such as water and an outlet;
e. means for transmitting a portion of the waste heat output of said engine to said heat exchanger:
f. means for transmitting vapor such as steam from said outlet of said heat exchanger to the input of said compressor; and
g. means for transmitting a portion of the heat from engine exhaust to the vapor being compressed in said compressor;
h. whereby vapor such as steam under pressure is available at the output of said compressor.

4,087,975

OCEAN THERMAL PLANT

Lester J. Owens, Titusville, Fla., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 29, 1977, Ser. No. 782,481
Int. Cl.[2] F03G 7/04
U.S. Cl. 60—641 13 Claims



1. In an apparatus for obtaining electrical power utilizing the difference in temperature between naturally heated surface sea water and cold water from greater depths, a vertically extending tubular housing having an upper inlet adjacent the top portion thereof for receiving warm sea water from adjacent the water surface and a lower inlet adjacent the bottom portion thereof for receiving colder water from a greater depth, a power generating means having a turbine for rotating an electrical generator that generates electricity, an evaporator for heating a working fluid with said warm sea water causing said working fluid to change from a liquid to a gas for rotating said turbine, and a condenser for cooling the gas exhausted from said turbine with said cold sea water to change said gas back to a liquid, the improvement comprising:

(a) said power generating means being located in said top portion of said tubular housing at a point above said upper inlet,

(b) a partition positioned horizontally in said tubular housing at a point below said upper inlet for isolating said warm sea water from said cold sea water,

(c) a first modular housing communicating with said tubular housing at a point above said partition for receiving and exhausting said warm sea water from said tubular housing,

(d) said evaporator being carried in said first modular housing so that said working fluid is converted from a liquid in said evaporator to a gas by said warm sea water flowing therethrough,

(e) a second modular housing communicating with said tubular housing at a point below said partition for receiving and exhausting said cold sea water from said tubular housing, and

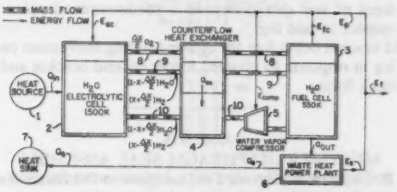
(f) said condenser being carried in said second modular housing for receiving said gas exhausted from said turbine and utilizing said cold sea water to convert said gas back to said liquid.

4,087,976

ELECTRIC POWER PLANT USING ELECTROLYTIC CELL-FUEL CELL COMBINATION

Walter E. Morrow, Jr., Weston, and Michael S. S. Hsu, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 13, 1976, Ser. No. 714,066
Int. Cl.[2] F01K 27/00; C25B 1/04
U.S. Cl. 60—643 5 Claims



1. An electrochemical energy system comprising

an electrolytic cell containing a dissociative working medium,

a source of thermal energy providing energy to said electrolytic cell,

a fuel cell providing electrical energy to said electrolytic cell,

said electrolytic cell being responsive to said thermal energy and said electrical energy to substantially dissociate and physically separate said working medium into its molecular components,

a counterflow heat exchanger,

said molecular components flowing from said electrolytic cell to said fuel cell through said heat exchanger and said working medium flowing from said fuel cell to said electrolytic cell through said heat exchanger wherein heat energy is transferred from the high temperature molecular component to the low temperature working medium to cool said molecular components to the temperature required by said fuel cell and to raise the temperature of the working medium to the temperature required by said electrolytic cell, and

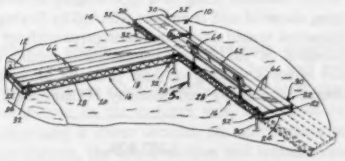
a compressor for compressing said working medium as it passes from said fuel cell to said electrolytic cell.

4,087,977

DOCK SYSTEM

Tom Evan Kuhlman, Spirit Lake, Iowa, assignor to Docks Unlimited, Spirit Lake, Iowa

Filed Mar. 24, 1977, Ser. No. 780,595
Int. Cl.[2] E02B 3/20
U.S. Cl. 61—48 9 Claims



1. A boat dock of improved stability and ease of assembly for mounting in a body of water having a bottom, said dock comprising:

a dock frame having an upper surface, opposite side frames, and end frames extending between said side frames;

at least one dock plank supported on said upper surface of said dock frames;

at least a pair of dock legs positioned on opposite sides of

said dock frame, each of said legs having its lower end anchored in said bottom of said body of water;

a leg holding bracket mounted for vertical sliding movement on each of said dock legs, said bracket comprising a sleeve having upper and lower sleeve ends and being slidably received upon said leg,

said bracket further comprising detachable mounting means for detachably mounting said bracket to said dock frame,

stop means on said leg below said sleeve for engaging said lower sleeve end and limiting downward sliding movement of said sleeve beyond a predetermined point with respect to said leg,

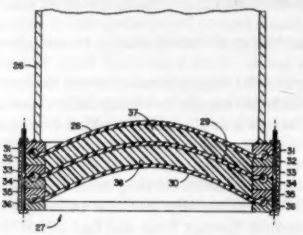
said bracket being free for upward sliding movement on said leg in response to upward forces on said bracket and said dock frame.

4,087,978

MULTIPLE DIAPHRAGM SEAL ASSEMBLY

Don B. Landers, Arlington, Tex., assignor to Oil States Rubber Company, Arlington, Tex.

Filed May 6, 1975, Ser. No. 574,919
Int. Cl.[2] E02D *5/00*
U.S. Cl. 61—53 **9 Claims**



1. In combination with a water immersible hollow tubular member such as an underwater piling guide and the like, a seal assembly for closing the immersible end of said hollow tubular member, including: a plurality of flexible diaphragm structures each comprising a sheet of rubber-like material of a type substantially deflectable and distortable when subject to a predetermined differential fluid pressure induced uniformly distributed loading; means for individually sealingly clamping the periphery of each of said diaphragm structures across said immersible end of said hollow tubular member in a spaced-apart, paralleled relationship, with each opposing space-separated surface-pair of adjacent ones of pairs of said diaphragm structures and inner surface portions of said means for clamping defining inner walls of a chamber; and a flexible force transmission media material completely filling each said chamber, with outer surfaces of said material in intimate engagement with said inner walls of said chamber and in unclamped engagement with said means for clamping; said force transmission media material being of a type readily conformable with changing shape of said chambers effected by flexing and distortion imparted to said diaphragm structures without appreciable compression of said force transmission media material, to thereby effect a sharing of fluid pressure induced uniformly distributed loading by said plurality of diaphragm structures.

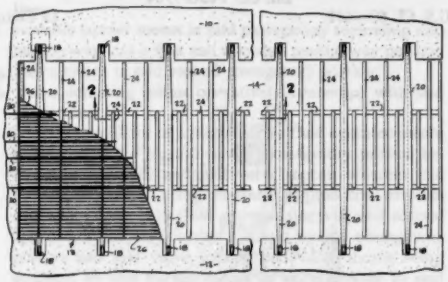
4,087,979

DRYDOCK LIFTING PLATFORM

Raymond Pearlson, Miami, Fla., assignor to Pearlson Engineering Company, Inc., Miami, Fla.

Filed Oct. 21, 1976, Ser. No. 734,642
Int. Cl.[2] B63C *1/09*
U.S. Cl. 61—65 **35 Claims**

1. A lifting type drydock having an elongated vertically movable multi-section platform including a plurality of platform sections each extending across the width of said platform and hingedly connected along adjacent edge portions to the next adjacent platform section, each of said platform sections including a main transverse lifting beam extending across the width of the platform section along one edge of the platform section, a plurality of longitudinal beams fixedly connected on one end to said main transverse beam and having their opposite ends pivotally connected to and supported by the main trans-



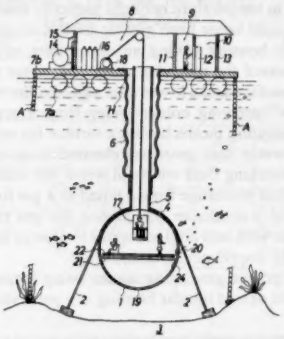
verse beam of a next-adjacent platform section, secondary transverse support beams fixedly connected to said longitudinal beams and power driven lifting support means connected to the ends of said main transverse beams for lifting or lowering said main transverse beams to effect a unitary vertical movement of said movable multi-section platform.

4,087,980

SAFETY SUBMARINE SPHERICAL AIR CHAMBER

Yutaka Kono, No. 18-27, 1-chome, Asahi-cho, Nerima-Ku, Tokyo, Japan

Filed Aug. 23, 1976, Ser. No. 716,874
Int. Cl.[2] B63C *11/00*
U.S. Cl. 61—69 R **8 Claims**



1. A safety submarine device comprising an air chamber body constituted entirely of a transparent flexible air-tight material and capable when inflated of assuming a spherical shape, an air feeding pipe connected to said air chamber, air supply means for filling said air chamber with compressed fresh air to cause said air chamber to form a spherical shape, personnel ascent and descent means connected to said air chamber, a sea water induction hole through which personnel can pass, means for adjusting the atmospheric pressure within the air chamber to substantially match the surrounding water pressure when submerged and to allow water to enter and fill a lower portion of the chamber through the sea water induction hole, a plurality of supporting members connected to the air chamber for maintaining stably said spherical air chamber in the sea, the atmospheric pressure adjusting means comprising an opening in the air chamber body through which excess compressed air within the air chamber can be discharged to the

outside sea, and personnel supporting means provided within the air chamber and floatably supported on the water therein.

4,087,981

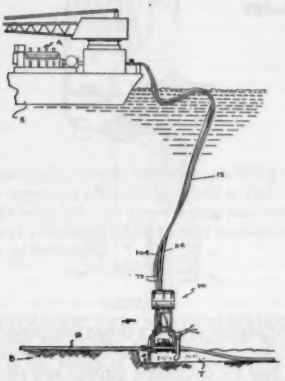
BUOYANT SELF-PROPELLED UNDERWATER TRENCHING APPARATUS

Robert M. Norman, Morgan City, La., assignor to Norman Offshore Services Inc., New Orleans, La.

Filed Aug. 27, 1971, Ser. No. 175,448

Int. Cl.² E02F *5/02*

U.S. Cl. 61—72.4 **44 Claims**



1. An underwater trenching apparatus for burying a pipeline or the like beneath the bottom of a body of water comprising:

a frame for positioning over the pipeline to be buried,

jet means supported by said frame, comprising a plurality of vertically arranged nozzles for digging a trench in said bottom for burying said pipeline,

eductor means supported by said frame for drawing up portions of said bottom cut by said jet means and discharging these portions away from said apparatus,

a first set of rollers secured to said apparatus and contacting said pipeline to direct said apparatus along said pipeline, drive means to drive at least one of said first rollers for movement of said apparatus along said pipeline, resilient means positioned between said first rollers and said apparatus to permit movement of said first rollers toward and away from the axis of said pipeline while following variations in circumference in said pipeline,

and including guide roller means mounted on said frame and extending in front of said jet means in contact with said pipeline to detect direction changes in said pipeline, guide roller mounting means secured at one end to said frame and having guide rollers mounted thereon at the other end for applying a torque to said frame angularly disposed to the direction of motion of said apparatus to correct the alignment of said apparatus in accordance with the direction of the pipeline whereby upon said guide roller means sensing a preselected magnitude of change in pipeline direction relative to the axis of said apparatus, a torque is applied to said apparatus to align the apparatus with said pipeline.

4,087,982

VIBRATORY PLOW

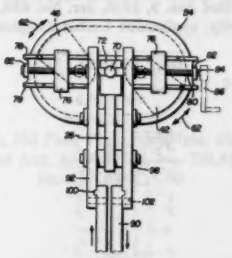
Gary L. Golobay, Valley Center, Kans., assignor to J. I. Case Company, Racine, Wis.

Filed Sep. 23, 1976, Ser. No. 726,741

Int. Cl.² F16L *1/00*

U.S. Cl. 61—72.6 **17 Claims**

1. A vibratory plow having a generally vertical elongated blade and a vibrator, said vibrator having a weight rotating within a vibrator housing resulting in oscillating motion of said vibrator housing about a neutral axis, a frame support having resilient bushing means supporting said vibrator in said neutral axis while permitting said vibrator to oscillate about said neutral axis, said blade connected to said vibrator housing spaced



from said vibrator neutral axis, said vibrator vibrating said blade in generally vertical oscillating motion and counterweight means supported on said vibrator housing on the opposed side of said neutral axis counterbalancing said blade.

4,087,983

OFFSHORE PLATFORMS

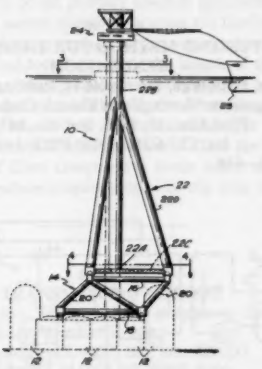
Eric Wood, Cosy Cottage, Haggs Hill, Ossett, Yorkshire, England

Filed Sep. 9, 1976, Ser. No. 721,898

Claims priority, application United Kingdom, Sep. 11, 1975, 37399/75

Int. Cl.² E02D *21/00*

U.S. Cl. 61—86 **8 Claims**



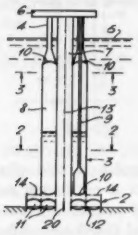
1. An offshore platform support structure comprising a column structure for standing on the sea bed, and being in three sections which are relatively tiltable in at least one plane which is transverse to the column axis, said three column sections comprising a lower section, an intermediate section and an upper section, the lower section and intermediate section being located one relative to the other by first locating means so as to be relatively tiltable about circumferentially arranged tilting axes, and the intermediate section and upper section being located one relative to the other by second location means so as to be relatively tiltable about circumferentially arranged tilting axes, the tilting axes between the lower and intermediate sections being angularly offset relative to the tilting axes between the intermediate and upper sections.

4,087,984

MARINE STRUCTURE FOR DRILLING AFTER AND/OR PRODUCTION OF HYDROCARBONS

Olav Mo, Asker, Norway, assignor to A/S Hoyer-Ellefsen, Norway

Filed Jun. 9, 1976, Ser. No. 694,431
Claims priority, application United Kingdom, Jun. 18, 1975, 25970/75
Int. Cl.[2] E02B 17/00
U.S. Cl. 61—94 9 Claims



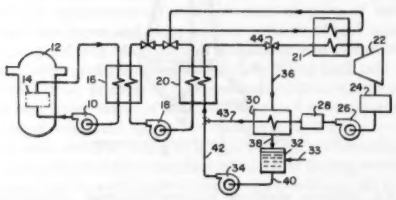
1. A floating off-shore platform which, in operation, is anchored to the sea bed by an anchoring means, said platform comprising an elongated floating structure which, in operation, floats in an upright position; an anchor means which, in operation, is founded on the sea bed beneath the floating structure; at least one vertically elongated member interconnecting the floating structure and the anchor means; means, located on said platform, for tensioning the at least one vertically elongated member so as to restrain vertical displacement of the floating structure; a plurality of horizontal members interconnecting the lower end of the floating structure and the anchor means; and means, located on said platform, for tensioning said horizontal member so as to restrain lateral displacement of the lower end of the floating structure.

4,087,985

APPARATUS AND METHOD FOR THERMAL POWER GENERATION

Paul Cohen, Pittsburgh, and Arnold H. Redding, Export, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 17, 1976, Ser. No. 667,793
Int. Cl.[2] G21D 5/08; F01K 3/00
U.S. Cl. 60—644 11 Claims



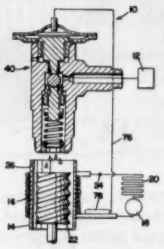
1. An improved thermal power plant comprising a primary fluid circuit between a nuclear reactor heat source and a heat exchanger, an intermediate fluid circuit between said heat exchanger and a steam generator, and a utilization circuit through which is circulated a fluid vaporizable in said steam generator, said steam generator comprising an evaporator section in which said vaporizable fluid vaporizes, said utilization circuit comprising a steam superheater in which said fluid is superheated, turbine, condenser, preheater between said condenser and said steam generator placing in heat transfer relation condensed fluid and a minor portion of fluid exiting said steam generator so as to preheat said condensed fluid, an inventory tank receiving said minor portion after passage of said portion through said preheater, means to combine fluid from said inventory tank with said previously condensed and preheated fluid, and means to discharge said combined fluid to said steam generator.

4,087,986

CONTROL VALVE

Darwin R. Grahl, Newark, N.Y., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Mar. 29, 1976, Ser. No. 671,679
Int. Cl.[2] F25C 5/02
U.S. Cl. 62—189 10 Claims



8. In a refrigerating system, a closed refrigeration circuit that includes a compressor, a condensor, an evaporator and a first refrigerant fluid for circulation through said circuit, a source for a second fluid to be cooled, a receiver for said second fluid, a valve for controlling flow of said second fluid from said source to said receiver, said valve including a valve chamber, an inlet passage, an outlet passage and a sensing bore, each communicating with the valve chamber, a valve element in said chamber and movable toward and away from a valve seat that surrounds the outlet passage, a thermostatic actuator having a piston extending through said sensing bore into engagement with said valve element and operable to urge the valve element toward said seat, said piston having an area exposed to pressure of fluid in said chamber to create a force on said piston acting in opposition to said actuator, a spring means acting on the valve element urging the same away from said seat and into engagement with said piston to apply a force to said piston in opposition to said actuator, said evaporator being located adjacent said receiver to withdraw heat therefrom, a temperature sensing device adjacent said evaporator and subject to temperature change in response to temperature changes in the evaporator, said device being connected to the actuator and containing a media that expands with increasing temperature and which acts upon the piston to move the same toward the valve element when the media expands, and said seat being larger in diameter than said sensing bore whereby there is an area on said valve element larger than said piston area and exposed to pressure of said second fluid within said valve chamber to urge the valve element to urge the valve element toward the valve seat.

4,087,987

DEFROST PRESSURE CONTROL SYSTEM

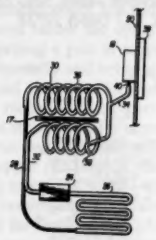
Frank A. Schumacher, and John E. Sterling, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Oct. 6, 1976, Ser. No. 729,999
Int. Cl.[2] F25D 21/06
U.S. Cl. 62—276 11 Claims

1. In a refrigerator system including a compressor, condenser and evaporator connected in series, and a heater for defrosting the evaporator as required, the compressor not running during a defrosting operation, a defrost pressure control system comprising:

(a) a reservoir for receiving a portion of the refrigerant employed in said refrigerating system; and

(b) means connecting said reservoir in communication with said refrigerating system in the region of said evaporator;
(c) said reservoir being positioned in heat exchange relationship with a region which remains relatively cold during defrosting for causing a portion of the refrigerant to condense is said reservoir during defrosting; and



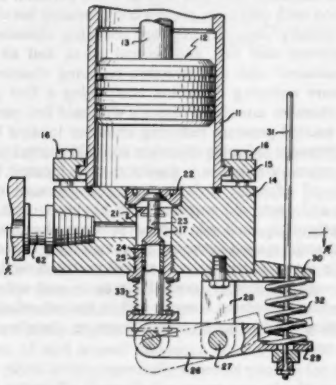
(d) condensed refrigerant in said reservoir being caused to be partially vaporized and to be returned to said refrigerating system as both gas and liquid when said compressor is started and reduces pressure in said evaporator after termination of defrosting.

4,087,988

CRYOGENIC EXPANSION MACHINE

Carl B. Pallaver, Woodridge, and Michael W. Morgan, Palos Park, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 9, 1976, Ser. No. 740,330
Int. Cl.[2] F25B *19/00*
U.S. Cl. 62—514 JT **2 Claims**



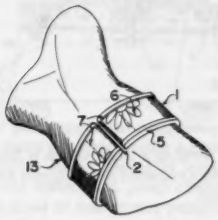
1. A cryogenic expansion engine comprising a DeWar vessel enclosing an expansion cylinder having a piston reciprocable therein, a cyliner head removably fastened to the bottom of the expansion cylinder, said cylinder head including a top and bottom wall, inlet and outlet poppet valves seated in a removable, threaded insert in the top wall of the cylinder head, said poppet valves placing inlet and outlet lines in communication with the expansion cylinder, means for opening and closing the poppet valves on a predetermined schedule including two cams, each cam including a cam base and a ring-shaped cam insert disposed at an exterior corner of the cam base, said cam base and cam insert being generally circular but including an enlarged cam dwell, the outer circumference of the cam base and cam insert being identical in configuration and diameter, said cam insert being rotatable with respect to the cam base and cam followers connected to said valves adapted to ride on both cam base and cam insert, said poppet valves and cam followers being connected by vertical actuating rods, rocker arms connected at one end to the bottom of said actuating rods and at the other to plastic bearings which in turn are connected to valve stems for the poppet valves, said plastic bearings extending through threaded removable inserts in the bottom wall of the removable head and bellows seals surrounding the plastic bearings.

4,087,989

BRACELET

George D. Taran, 252 Paoa Place, Honolulu, Hi. 96815

Filed Aug. 2, 1976, Ser. No. 710,918
Int. Cl.[2] A44C *5/00*
U.S. Cl. 63—11 **1 Claim**



1. A bracelet comprising:
a. a resilient discontinuous wrist encircling primary bracelet structure having on its outside surface facing away from the wrist, a recessed central surface with an upstanding ridge on each edge thereof thereby providing a protected surface for a decorative cover;
b. a flexible decorative cover, the length and width of which are approximately the length and width of the recessed outer surface of the primary bracelet structure; and
c. attachment means operably securing the flexible cover to the recessed outer surface of the primary bracelet structure at spaced locations along the length of the bracelet comprising a multiple of pieces of transfer tape having adhesive on both faces whereby the decorative cover may be securely attached to the bracelet and the spaces between the means of attachment will allow the decorative cover relief from compressive loads when the primary bracelet structure is sprung open to slip over the wrist.

4,087,990

TRANSMITTING TORQUE

Willard D. Gillette, Topsham, Me., assignor to Zephyr Wind Dynamo Company, Brunswick, Me.

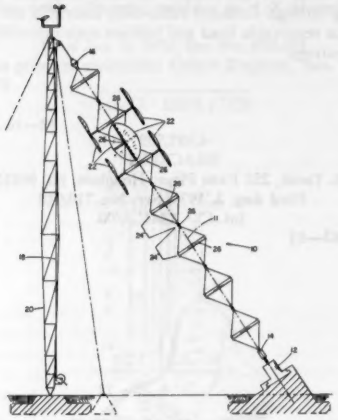
Filed Jan. 17, 1977, Ser. No. 759,733
Int. Cl.[2] F16C *1/02*; F03D *9/00*
U.S. Cl. 64—2 P **13 Claims**

1. A torque transmitting structure extending along an axis and adapted to receive and deliver torque, said structure comprising a plurality of links connected end-to-end along said axis, each link comprising a rigid spar transverse to said axis situated at one end of the link, a second rigid spar transverse to said axis and skew to said first spar situated at a second end of the link, and four connecting ties connecting the ends of said first and second spars, the two spars and four connecting ties forming a link of generally tetrahedral form with said spars being common to adjacent links,

said spars and said connecting ties being connected through linkages permitting relative rotation therebetween,

at least two of said connecting ties in each link being bendable to permit their ends to be juxtaposed, said two bend-

able connecting ties occupying opposite edges of each tetrahedral link,



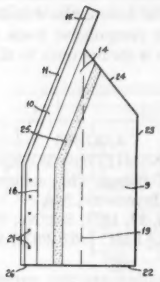
said structure forming a chain which is flexible and torsionally rigid when extended along its axis and collapsible to a compact form.

4,087,991

FASHIONED GARMENT INCLUDING BODY PANELS CONTAINING WALES RUNNING HORIZONTALLY AND INCLINED TO A FINISHED EDGE

Frank Robinson, Breaston; Keith Harry Girt, Menstone, Nr. Ilkley, and Nigel Stephen Whatmough, Breaston, all of England, assignors to Courtaulds Limited, London, England

Filed Aug. 11, 1976, Ser. No. 713,424
Int. Cl.² D04B *7/10, 7/22, 7/30;* A41D *1/04*
U.S. Cl. 66—189 **9 Claims**



1. A method of knitting a body panel for a garment, said method comprising

(a) knitting an edge portion for said panel, said edge portion comprising at least a non-run set-up,

(b) knitting on from said edge portion on some only of needles holding loops of the edge portion, whilst maintaining inactive further needles holding loops of said edge portion, and

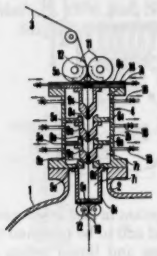
(c) introducing said inactive needles holding loops of the edge portion into knitting action subsequently during the knitting process, thereby shaping said panel, with wales inclined to said edge portion.

4,087,992

PRESSURE SEALING DEVICE FOR HIGH PRESSURE STEAMER

Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Japan

Filed Jul. 8, 1976, Ser. No. 703,586
Claims priority, application Japan, Sep. 22, 1975, 50-114531
Int. Cl.² D06B *23/18*
U.S. Cl. 68—5 E **4 Claims**



1. A pressure dealing device for a high pressure steamer for conveying a cloth material into or out of the drum body of the high pressure steamer, comprising a main sealing body arranged to be connected to the drum body, said main sealing body having a first port arranged to open into the drum body and a second port arranged to open to the exterior of the drum body, a first pair of seal rolls located at and inwardly of said first port relative to the drum body, a second pair of seal rolls located at and outwardly of said second port relative to the drum body, in each of said first and second pair of rolls, said rolls being disposed in pressed contact with one another for closing the adjacent first and second port, partition means in combination with said main sealing body forming between two and five serially arranged pressure reducing chambers positioned between said first and second ports, and air release means associated with said pressure reducing chambers, and said pressure reducing chambers comprising a first pressure reducing chamber associated directly with said first port and at least one second pressure reducing chamber located between said first pressure reducing chamber and said second port, said partition means comprises a partition wall located between each pair of adjacent serially arranged pressure reducing chambers and each said partition wall having a cloth passing hole therethrough, each said second pressure chamber having a nozzle therein spaced inwardly from said main sealing body, said nozzle mounted on the one of said partition walls of said second pressure chamber located closer to said second port and extending therefrom toward and in spaced relation with said partition wall of said second pressure chamber located closer to said first

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4,087,993

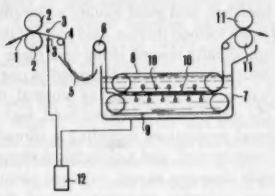
HEAT FULLING AND WATER WASHING APPARATUS

Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Japan

Continuation of Ser. No. 628,495, Nov. 3, 1975, abandoned, which is a continuation of Ser. No. 478,749, Jun. 12, 1974, abandoned. This application Apr. 4, 1977, Ser. No. 784,329
Int. Cl.² D06B *3/20*
U.S. Cl. 68—18 R **2 Claims**

1. A heated fulling and water washing apparatus comprising a washing tank containing a cleaning fluid and having a liquid level therein, means for conveying cloth to said washing tank including squeezing rolls, a guide roll located between said squeezing rolls and said washing tank, a feeder roll located above said washing tank and positioned between said guide roll and said washing tank, a piler located between said guide roll and said feeder roll and spaced below said guide roll and feed roll and arranged to accumulate cloth for passage into said

washing tank in an untensioned state, a first conveyor means and a second conveyor means located in said washing tank, said first conveyor means comprising a pair of first rollers having their axes arranged horizontally and being spaced apart in a horizontal direction; and an endless first net conveyer trained over said first rollers and said first net conveyer having a horizontally extending upper run and a horizontally extending lower run spaced below the upper run, said second conveyer means comprising a pair of second rollers having their axes arranged horizontally and being spaced apart in the horizontal direction, said second rollers being located below said first rollers, and a second net conveyer trained over said second rollers and said second net conveyer having a horizontally extending upper run and a horizontally extending lower run spaced below the upper run thereof, the lower run of said first net conveyer being spaced above the upper run of said second net conveyer and forming therebetween a horizontally extending space arranged for the passage therethrough of a cloth to be treated moving generally in a horizontal direction between the rollers of said first and second net conveyers, the lower surface of the lower run of said first net conveyer and the upper surface of the upper run of said second conveyer each being located below the liquid level in said washing tank and each forming a contact surface for the cloth being treated so that as the cloth moves in contact with the surface of one said conveyer it is spaced from the other said conveyer with the vertical space between the two contact surfaces being sufficient for the cloth to adapt a wave form shape as it moves between and in contact with the surfaces, a plurality of horizontally extending first fluid injection pipes disposed in horizontally spaced relation and located between the upper and



lower runs of said first net conveyer with the axes of said pipes disposed in parallel relation with the axes of the rollers of said first conveyer means, said first fluid injection pipes having downwardly direct nozzles for directing hot fluid downwardly through the lower run of the first net conveyer into the space between the first and second net conveyers, a plurality of horizontally arranged second fluid injection pipes disposed in horizontally spaced relation and located between the upper and lower runs of said second net conveyer with the axes of said second pipes disposed in parallel relation with the axes of the rollers of said second conveyer means, said second fluid injection pipes having upwardly directed nozzles for directing hot fluid upwardly through the upper run of said second net conveyer into the space between the first and second net conveyers, said first and second fluid injection pipes being arranged in an alternating manner along the path of the cloth through the space between said first and second net conveyers so that the cloth being treated receives alternating sprays on its upper and lower surfaces as it moves in the horizontal direction through the space between said first and second net conveyers whereby the sprays impart a wave-like configuration to the cloth as it moves through the space without any tension being exerted on the cloth in its direction of movement through the space, and the axial length of each of said first and second fluid injection pipes being shorter than the transverse width of said first and second net conveyers and being spaced inwardly from the edges of said first and second net conveyers so that the cloth passing through the space between said first and second net conveyers receives a spray directed from said first and second fluid injection pipes for affording an expanding effect to the cloth being treated.

4,087,994

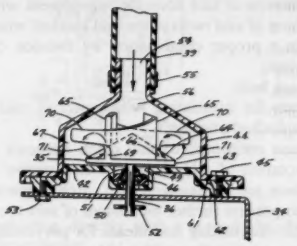
CENTRIFUGAL PUMP WITH MEANS FOR PRECLUDING AIRLOCK

John D. Goodlaxson, Colfax, Iowa, assignor to The Maytag Company, Newton, Iowa

Filed Sep. 7, 1976, Ser. No. 720,692

Int. Cl.[2] F01D *5/14;* **F03B** *3/12;* **D06F** *35/00*

U.S. Cl. 68—23.7 **11 Claims**



1. A centrifugal pump apparatus comprising: pump housing means defining a pump chamber having a liquid ingress and a liquid egress; impeller means having at least one blade and operatively disposed within said pump chamber for moving liquid from said ingress to said egress; pump drive means for operating said impeller means; means for mounting said housing means and said pump drive means in operative association; and a projection on said impeller means, said projection having an axially reduced dimension relative to the axial dimension of said blade and extending outwardly beyond said blade into an outermost portion of said pump chamber for cutting through said liquid in said outermost chamber portion and creating a turbulence in said liquid to achieve a mixing of said liquid with air in an inner portion of said pump chamber whereby an airlock condition is prevented.

4,087,995

COMBINATION LOCK

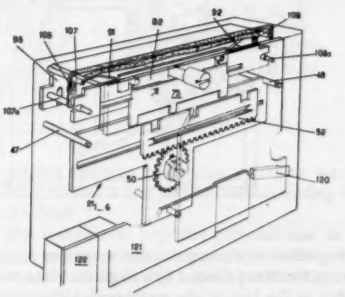
François Guiraud, Chambourcy, France, assignor to Fichet-Bauche, Velizy, France

Filed Nov. 18, 1975, Ser. No. 633,050

Claims priority, application France, Nov. 26, 1974, 74 38742; Oct. 20, 1975, 75 32044

Int. Cl.[2] E05B *37/00*

U.S. Cl. 70—299 **32 Claims**



1. A combination lock for a safe, chest or strong room door, comprising:

an operating shaft extending through said door and having a lock-actuating end;

means mounted on the exterior of said door for selectively adjusting the translational and rotational positions of said lock-actuating end of said operating shaft;

a plurality of spaced, toothed wheels mounted for rotation on the interior of said door in position to be rotated by said lock-actuating end of said operating shaft;

a corresponding plurality of racks mounted on the interior of said door for engagement with corresponding ones of said toothed wheels for lateral translation in response to rotation thereof;

a corresponding plurality of catch elements mounted on the interior of said door for engagement with corresponding ones of said racks when said toothed wheels have been set in a proper combination by rotation of said operating shaft;

a lock bolt;

means for preventing withdrawal of said lock bolt to an unlocked position;

means connected to said catch elements and operable by rotation of said shaft after said proper combination has been set, for engaging said catch elements with said racks to prevent further movement of said toothed wheels, and for deactuating said means for preventing withdrawal;

means cooperating with said lock-actuating end of said shaft for withdrawing said bolt upon further rotation of said shaft;

means cooperating with said lock-actuating end of said shaft for disengaging said catch elements from said racks upon further rotation of said shaft; and

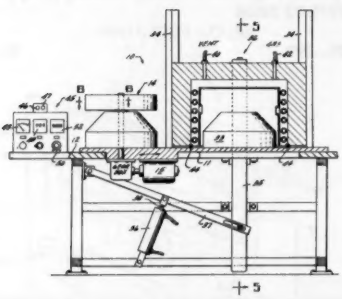
means cooperating with said lock-actuating end of said shaft for displacing said racks to cancel said proper combination.

4,087,996

METHOD AND APPARATUS FOR CORRECTING DISTORTION IN GAS TURBINE ENGINE BLADES

Wilbrod Alfred Paille, Ludlow, Vt., assignor to General Electric Company, Lynn, Mass.

Filed Dec. 13, 1976, Ser. No. 749,847
Int. Cl.[2] B21K *3/04*
U.S. Cl. 72—38 **16 Claims**



1. A method of forming metallic structures comprising:

placing the cavity formed by a single die in abutting relationship to the face of the structure which is desired to be formed,

heating the structure to the creep temperature of the material of which it is constructed,

applying centrifugal force to compress the structure against the die cavity by rotating the structure and die cavity,

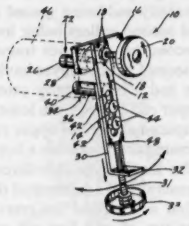
maintaining the centrifugal force and creep temperature a sufficient length of time to conform the abutting face of the structure to the shape of the cavity.

4,087,997

PIPE END SHAPER TOOL

Dwayne K. Steenhoek, 507 Main St., Pella, Iowa 50219

Filed Apr. 14, 1977, Ser. No. 787,385
Int. Cl.[2] B21D *41/02*
U.S. Cl. 72—122 **1 Claim**



1. A pipe end shaper tool comprising:

a first elongated member having a closed longitudinal slot formed therein;

a hand hold rigidly attached to said first member and extending upwardly therefrom said hand hold including an enlarged circular top portion;

a plate rigidly attached to one end of said first member below said hand hold and extending outwardly normal to said first member, said plate having a plurality of pairs of threaded holes formed therein, said pairs of threaded holes being longitudinally spaced along said plate;

a pair of cylindrical projections threaded in one of said pairs of threaded holes and extending normal to said plate opposite the direction of said hand hold, each of said pairs of cylindrical projections including a threaded shaft, an enlarged circular end, and a cylindrical sleeve having the same outside diameter as said enlarged circular end, said sleeve being rotatably mounted on said threaded shaft between said plate and said enlarged circular end;

a second elongated member having a plurality of holes formed therein said holes being registerable with said slot of said first member, said second member being movably mounted for longitudinal movement with respect to said first member by a plurality of bolts extending through said holes in said second member and said slot in said first member, said bolts having enlarged heads slidably engaging the surface of said first member adjacent said slot, said second member including a raised portion extending upwardly from one end thereof, said raised portion having a threaded opening formed therethrough; and,

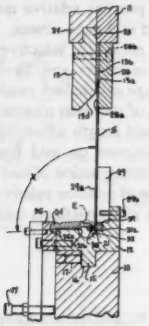
a third cylindrical projection attached near the other end of said second member and extending normal thereto opposite the direction of said raised portion, said third cylindrical projection including a shaft attached to said second member, an enlarged circular end, and a cylindrical sleeve having the same outside diameter as said enlarged circular end, said sleeve being rotatably mounted on said shaft between said second member and said enlarged circular end; and adjusting means including a threaded adjusting shaft threadably received through the threaded opening in said raised portion of said second member and disposed in contacting relationship with the free end of said first member and an operator wheel attached to the forward end of said threaded adjusting shaft, whereby rotation of the operator wheel moves said first member, and the attached pair of projections with respect to said second member, and the attached third projection, thereby progressively increasing the distance there between.

4,087,998

CURLING DIE APPARATUS

Clarence H. Hager, Rockford, Ill., assignor to Modern Suspension Systems, Inc., Rockford, Ill.

Filed May 6, 1977, Ser. No. 794,538
Int. Cl.[2] B21D 5/14
U.S. Cl. 72—166 22 Claims



1. An apparatus for forming a curled edge constituting at least a major portion of a cylinder on a sheet of deformable material comprising: a curling die having an elongaged semi-cylindrical cavity open at one side and having lengthwise extending inlet and outlet edges, means for advancing a sheet of deformable material edgewise along a path with one side of the sheet tangent to said semi-cylindrical cavity at the inlet edge thereof, a sheet guide member having a nose portion paralleling said semi-cylindrical cavity, means mounting the sheet guide member for movement relative to the curling die in a direction laterally of the die cavity between a sheet guiding position in which the nose portion is spaced radially inwardly from the inlet edge of the die cavity and a moved position in which the guide member is spaced from the open side of the die cavity, said movable sheet guide member in said sheet guiding position thereof having its nose portion spaced from said inlet edge of the die cavity a distance substantially equal to the thickness of the sheet of material to guidably engage the other side of the sheet of material as it is advanced along said path whereby to maintain the sheet in engagement with said semi-cylindrical die cavity at said inlet edge thereof while the lead edge of the sheet moves progressively in a curl along the semi-cylindrical die cavity toward the outlet edge thereof, and means responsive to movement of the lead edge of the sheet along said semi-cylindrical cavity through a preselected arc substantially greater than 90° and less than the arc corresponding to said major portion of a cylinder for moving said sheet guide member from its sheet guiding position to said moved position whereby to allow the lead edge of the sheet to continue to curl through said major portion of a cylinder.

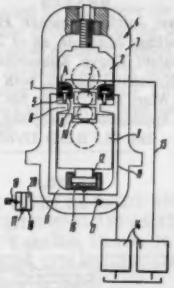
4,087,999

DEVICE FOR AUTOMATIC ADJUSTMENT OF ROLL GAP IN MILL STAND

Vladimir Nikolaevich Vydrin, ulitsa Timiryazeva 28, kv. 27; Vladimir Georgievich Dukmasov, ulitsa Soni Krivoi 77, kv. 5, and Garifulla Davlyatshin, Komsomolsky prospekt 15, kv. 100, all of Chelyabinsk, U.S.S.R.

Filed Dec. 28, 1976, Ser. No. 755,039
Int. Cl.[2] B21B 31/32
U.S. Cl. 72—245 2 Claims

1. A device for automatic adjustment of a roll gap in a mill stand, comprising: two-chamber hydraulic cylinders for prestressing said stand; hollow hydraulic dynamometers to absorb a roll force, said dynamometers being mounted under chocks of at least one of the rolls and not being affected by the action of said hydraulic cylinders, a chamber of each of said hydraulic dynamometers communicating directly with a first chamber of each said hydraulic cylinder; and a constant-pressure fluid



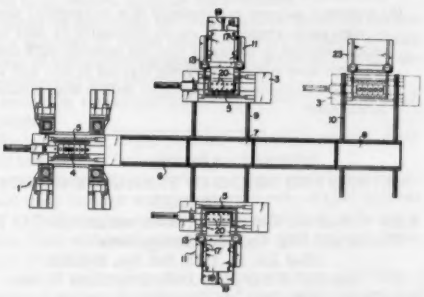
source in communication directly with a second chamber of each said hydraulic cylinder.

4,088,000

HOT FORGING MACHINE HAVING DIE PREHEATING UNIT

Kunio Tomioka; Masaaki Kita, and Terushige Sakurai, all of Komatsu, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed May 2, 1977, Ser. No. 792,975
Int. Cl.[2] B21J 9/00
U.S. Cl. 72—342 3 Claims



1. A hot forging machine comprising a forging machine having a moving bolster, a pair of main rails extending from said forging machine,

a pair of first branch rails provided perpendicular to said main rails, a pair of second branch rails provided perpendicular to said main rails and a spaced relationship with said first branch rails,

a heating unit for a die provided at one end of said first branch rails, and

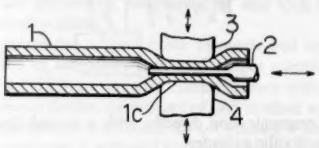
a pattern change unit for changing and/or repairing the die provided at one end of said second branch rails, the moving bolster of said forging machine being adapted to run on said respective rails whereby preheating of the die by said heating unit can be effected while said forging machine is in operation.

4,088,001

METHOD OF MANUFACTURING A STRUT MEMBER MADE OF A TUBE MATERIAL FOR USE WITH DRUM BRAKES

Masakazu Ishikawa; Juichi Shibatani; Hiroyuki Oka; Naomi Mitsuoka, and Mitsuo Matsuda, all of Toyota, Japan, assignors to Hosei Buleki Kogyo Kabushiki Kaisha and Toyota Jidosha Kogyo Kabushiki Kaisha, both of Toyota, Japan

Filed Mar. 2, 1977, Ser. No. 773,661
Claims priority, application Japan, Sep. 13, 1976, 51/109611
Int. Cl.[2] B21D *53/88*
U.S. Cl. 72—370 4 Claims



1. A method of manufacturing a strut member usable in a strut device of a drum brake, made of a tubular stock material and having a threadedly connectable portion in the middle thereof for adjusting shoe clearance, the method comprising:

(a) forming on the tubular stock a flat plate-like portion having a through bore therein as a displaced space, by inserting a mandrel substantially concentrically into said tubular stock material, pressing or squeezing a given length of said tubular stock material in the diametrical direction onto the mandrel for contemporaneously bringing portions of the inner surface thereon into contact, forming said flat plate-like portion and producing a through bore therein as a displaced space, said portions of said inner surface defining respective upper and lower portions of said tubular stock material, and withdrawing said mandrel thereby leaving said portions of said inner surface in contact with said displaced space as a through bore in the member for allowing communication with the atmosphere ambient; and

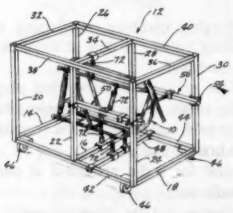
(b) making a cut-out substantially of a rectangular shape, in a plan view, ranging from an extremity of said tubular stock material to a part of said flat portion, such that said through bore has one opening thereof at one end of said cut-out to be able to be engaged with a web portion of a brake shoe.

4,088,002

METHOD AND MEANS OF STRAIGHTENING CYCLE FRAMES

Keith V. Andrew, Des Moines, Iowa, assignor to G.C. Barnes Tooling and Mfg. Co., Inc., Baxter, Iowa

Filed Jul. 10, 1975, Ser. No. 594,782
Int. Cl.[2] B21D *1/14, 3/10, 3/16;* B21J *13/04*
U.S. Cl. 72—389 7 Claims



1. A means for straightening cycle frames comprising,

a cage means including spaced-apart frame members adapted to receive the cycle frame therein, said cage means including vertically disposed side frame members, top frame members secured to and extending between the upper ends of said side frame members, and bottom frame members secured to and extending between the lower ends of said side frame members,

length adjustable thrust support members for selective attachment to said, top, side and bottom frame members in force opposing disposition for opposing engagement with the cycle frame to securely lock said cycle frame to said cage means to prevent relative movement between said cycle frame and said cage means,

and a power ram means for selective adjustable connection to said frame members and having an extendible rod adapted to engage and deflect portions of said cycle frame upon actuation of said ram means,

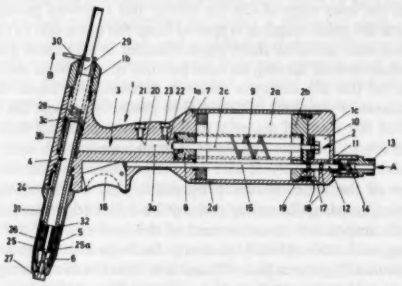
at least some of said length adjustable thrust support members being positioned on said frame members so as to oppose the deflecting action of said ram means to maintain said cycle frame in position relative to said cage means as said power ram means deflects said portions of said cycle frame.

4,088,003

BLIND RIVETER

Manfred Schwab, Wiesbaden, Germany, assignor to Fa. Alfred Hansel, Nieten- und Metallwarenfabrik, Ruhr, Germany

Filed Aug. 25, 1976, Ser. No. 717,491
Claims priority, application Germany, Aug. 25, 1975, 2537792
Int. Cl.[2] B21J *15/34*
U.S. Cl. 72—391 6 Claims



1. In a blind riveter comprising

a chuck,

a hydraulic system for moving the chuck, and

a pneumatic system comprising a cylinder, a piston, a movable piston rod attached to the piston, a longitudinally slidable valve tappet, and valve means for a supply of compressed air, the valve means being operable by the longitudinal sliding of the valve tappet to supply compressed air into the cylinder, wherein the movable piston rod of the pneumatic system moves in the hydraulic system under the working stroke of the piston for activating the hydraulic system to move the chuck,

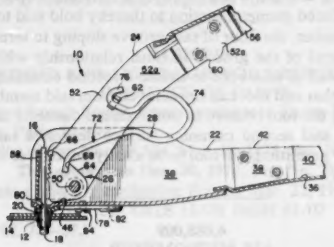
the improvement comprising that the valve tappet intersperses the cylinder and the piston of the pneumatic system and extends parallel to the longitudinal axis of the cylinder and the piston, wherein said valve tappet penetrates the walls of said cylinder and said piston and is surrounded by sealing means where it penetrates through the walls of said cylinder and said piston.

4,088,004

FASTENING TOOL DEVICE

Anthony E. Di Maio, and Joseph G. Todisco, both of Georgetown, Mass., assignors to Marson Fastener Corporation, Chelsea, Mass.

Filed May 13, 1977, Ser. No. 796,806
Int. Cl.[2] B21J *15/34*
U.S. Cl. 72—391 **10 Claims**



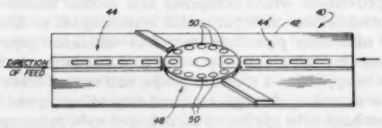
1. Apparatus for gripping and pulling on an elongated mandrel comprising first means having a supporting surface and at least one opening therethrough for receiving the mandrel; second means pivotally connect to the first means for pivotal movement about a pivotal axis between a first position and a second position, said second means has a mandrel receiving portion which cooperates with the mandrel and is conjointly movable therewith; jaw means operatively connected to the second means for movement therewith and for movement relative thereto about said pivotal axis towards and away from the mandrel receiving portion; and biasing means for biasing said jaw means in one direction such that said jaw means contacts said supporting surface whenever the second means is in at least the first position and a mandrel is insertable through the opening and between said receiving portion and said jaw means, said biasing means initially biases the jaw means into contact with the supporting surface while the second means moves to the second position such that the receiving portion moves towards said jaw means to cause the mandrel to become tightly gripped between it and the jaw means whereupon the continued movement of said second means to the second position moves said jaw means away from contact with said supporting surface and into tighter gripping engagement with the mandrel to forcefully pull generally upwardly on the mandrel.

4,088,005

COMBINED ROTARY PROGRESSIVE DIE

Frank Starr, Menomonee Falls, Wis., assignor to Koller Die and Tool Co., Milwaukee, Wis.

Filed May 31, 1977, Ser. No. 801,753
Int. Cl.[2] B21D *43/05*
U.S. Cl. 72—404 **9 Claims**



1. Progressive rotary die unit for forming metal piece parts comprising:

(a) Upper and lower die shoes adapted to be mounted in a press for relative vertical reciprocation;

(b) Said die shoes having a plurality of stations of coacting tool sets;

(c) At least one group of said stations defining a progressive die for receiving a strip of material and for performing a series of metal working operations on said strip to define partially formed piece parts;

(d) A second group of said stations being arranged about a circumference of a circle;

(e) A dial plate mounted on said lower die shoe and having cavities therein, said cavities coacting with tools of said upper die shoe to sever partially formed piece parts from said strip and for nesting said parts; and

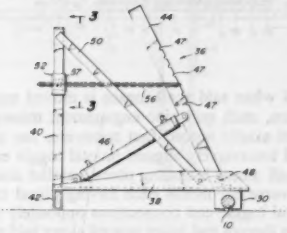
(f) Means for rotating said partially formed piece parts through said second group of stations upon relative reciprocation of said die.

4,088,006

AUTOMOTIVE VEHICLE BODY AND FRAME STRAIGHTENING APPARATUS

Edgar W. Patten, 1477 Lake Rd., Hamlin, N.Y. 14464

Filed Aug. 26, 1976, Ser. No. 718,025
Int. Cl.[2] B21D *1/14*
U.S. Cl. 72—457 **12 Claims**



1. An automotive vehicle body and frame straightening apparatus comprising:

(a) an endless track member of generally rectangular shape and having arcuate corners,

(b) said track member being of substantially round cross-section and having at least one portion of reduced thickness and being spaced from the floor surface,

(c) means for anchoring said track member to a floor surface at a plurality of points along said track member, at least some of said anchoring means being positioned outside the periphery of said track member,

(d) means for removably anchoring a vehicle to said track member,

(e) force applying means pivotally adjustable about a vertical axis passing through said track member,

(f) means removably anchoring said force applying means to said track member and comprising a yoke shaped member of a configuration such as to be attachable to and removable from said track member only at said reduced thickness portion,

(g) each of said removable anchoring means including a channel passing therethrough and open on the bottom and adapted to engage the periphery of said track member through an arc of at least 270°,

(h) each of said removable anchoring means and said force applying means being slidably positionable to any point along said track member without disengagement from said track member.

4,088,007

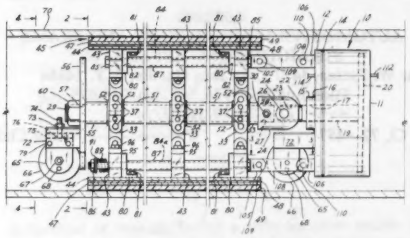
PIPE BENDING MANDREL

Edward A. Clavin, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

Filed Jan. 24, 1977, Ser. No. 761,881
Int. Cl.[2] B21D *9/00*
U.S. Cl. 72—466 **12 Claims**

1. Pipe bending mandrel apparatus for supporting the wall of a pipe during bending of the pipe, comprising drive means

having a shaft means reciprocably movable axially of a pipe to be bent, a unitary elongate pipe engagement means disposed at each of opposite sides of said shaft means for engaging opposite sides of the wall of the pipe, first toggle means connecting each said pipe engagement means to said drive means and permitting inward and outward movements of said pipe engagement means, plural axially spaced second toggle means connecting each said pipe engagement means to said shaft means whereby said pipe engagement means are drawn inwardly toward said shaft means when said shaft means is moved axially in one direction and are forced outwardly against opposite sides of



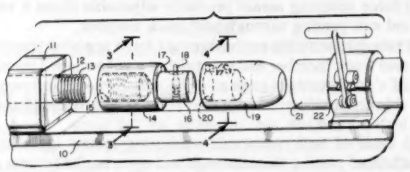
the pipe wall when said shaft means is moved axially in the other direction, each said pipe engagement means including plural parallel axially spaced first transverse bar means each having plural transversely aligned pivotal toggle end connections, said shaft means including plural parallel axially spaced second transverse bar means each having plural transversely aligned pivotal toggle end connections oppositely disposed at opposite sides thereof and being spaced along said shaft means by spacer sleeves disposed around said shaft means, said second toggle means each comprising plural parallel toggles each connected between toggle end connections of said first and second transverse bar means.

4,088,008

QUICK RELEASE ADAPTER AND TOOL COMBINATION

Leighton Harvey Watling, Camarillo, and Donald R. Henthorn, Simi Valley both of Calif., assignors to American Machine & Hydraulics, Inc., Newbury Park, Calif.

Filed Apr. 18, 1977, Ser. No. 788,360
Int. Cl.[2] B21D *37/04*
U.S. Cl. 72—481 **4 Claims**



1. A quick release adapter and tool combination to facilitate attaching the tool to and removing the tool from a portion of a machine in which an axial load is to be exerted on the tool which is substantially greater in one direction than the opposite direction, including:

(a) a member having means at one end for securing it to said portion of said machine and terminating at its other end in a reduced diameter cylindrical section to define an annular shoulder facing in said one direction, a surface portion of said reduced diameter section including a diametric pin radially biased outwardly to project above said surface portion, said pin being capable of being depressed to a position flush with said surface portion; and

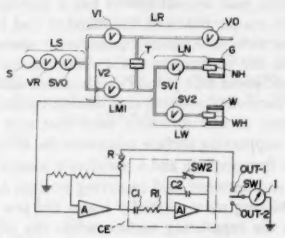
(b) a tool having an entrance bore at one end telescopically receivable over said reduced diameter cylindrical section with the periphery of said entrance bore seating on said annular shoulder so that a relatively large axial load can be exerted on said tool by said shoulder, an end peripheral portion of said entrance bore defining a pin receiving channel having a first camming surface sloping axially and radially for depressing said pin upon telescoping of said tool over said reduced diameter section, an inside circumferential portion of the wall of said bore including a groove running transverse to the axis of said bore for receiving said pin when said tool is fully telescoped over said reduced diameter section to thereby hold said tool on said member, the floor of said groove sloping to terminate at one end of the groove in flush relationship with said inside wall of said bore to define a second camming surface so that said tool can be removed from said member by rotating the tool relative to said reduced diameter section so that said second camming surface depresses said pin thereby permitting the tool to be axially pulled free of said member.

4,088,009

AIR MICROMETER

Akira Fukuda, 2-22-8 Kasuga-cho, Nerima-ku, Tokyo, Japan

Continuation-in-part of Ser. No. 476,170, Jun. 4, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 678,289
Claims priority, application Japan, Jun. 9, 1973, 48/65193
Int. Cl.[2] G01B *13/10*
U.S. Cl. 73—4 R **1 Claim**



1. In an air micrometer including a main pipe line having an end connected to an air pressure source and another end branching off to a first branch pipe line and a second branch pipe line, said first branch pipe line extending through a first adjustable orifice valve and a zero adjusting valve to outer air, said second branch pipe line extending through a second adjustable orifice valve to a measurement head, said first branch pipe line branching off at the outlet side of said first orifice valve to an inlet of a differential pressure transducer and connecting thereto, said second branch pipe line branching off at the outlet side of said second orifice valve to another inlet of said transducer and connecting thereto, the output terminal of said transducer being connected to the input terminal of a direct current amplifier for the indication of differential pressure between outlet sides of said first and second orifice valves; the improvement which comprises said second branch pipe line second orifice valve outlet side branching off to first and second subbranch pipe lines, said first subbranch pipe line extending through a first stop valve to a standard measuring head to be applied to a standard gauge, said second subbranch pipe line extending through a second stop valve to said measurement head to be applied to a workpiece to be measured, an output correction circuit connected to said amplifier, first and second output terminals, and a changeover switch for selectively connecting said first and second output terminals to the input terminal of an indicator, said first output terminal being connected through a variable resistor to said amplifier output terminal, and said second output terminal being connected to said output correction circuit output terminal, said output correction circuit including a circuit means for eliminating said amplifier output, a circuit means for passing said amplifier

output through said output correction circuit, and a switch means for selectively connecting said former and latter circuit means between said amplifier output terminal and said second output terminal, said circuit for eliminating said amplifier output is a differentiation circuit, said circuit for passing said amplifier output is said differentiation circuit and an integration circuit connected in series, and said switch means for selectively connecting said former and latter circuits is connected in parallel to said integration circuit.

4,088,010

METHOD AND APPARATUS FOR DETECTING THE PRESENCE OF YARNS

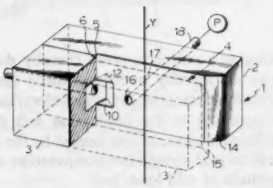
Bernard Isoard, Ecully, France, assignor to Rhone-Poulenc-Textile, Paris, France

Division of Ser. No. 559,534, Mar. 18, 1975, Pat. No. 4,023,399. This application Dec. 30, 1976, Ser. No. 755,591

Claims priority, application France, Mar. 22, 1974, 74 10430

Int. Cl.² G01B *13/00*; B65H *63/02*

U.S. Cl. 73—37.7 **4 Claims**



1. The method for detecting the presence of a traveling yarn comprising

(a) confining a traveling yarn in a narrow zone between parallel plane walls which are able to accommodate oscillations in the path of travel of the yarn, in a plane parallel to and between the parallel plane walls, without contacting the yarn,

(b) supplying an unidirectional flow of gas to said narrow zone and against said yarn, and

(c) monitoring the pressure in said narrow zone intermediate said yarn and said gas supply, whereby when the yarn is present in said narrow zone the pressure is higher than when the yarn is not present to form the sole obstruction to the gas flow.

4,088,011

GASOLINE ENGINE PISTON POSITION TESTER

Kenneth E. Bodine, 660 E. Geddes, Littleton, Colo. 80122, and Verle A. McDowell, 4675 S. Lincoln, Englewood, Colo. 80110

Continuation-in-part of Ser. No. 598,707, Jul. 24, 1975, abandoned. This application Feb. 7, 1977, Ser. No. 766,448

Int. Cl.² G01M *15/00*

U.S. Cl. 73—116 **1 Claim**

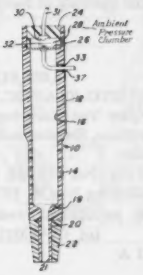
1. In a combination with an automobile including an electrical system with signal components such as lights and a horn, an internal combustion engine and a driver's compartment wherein the engine may be cranked by turning the ignition key of the engine, a tester to indicate the compression stroke of the piston within a selected cylinder of the internal combustion engine and to operate a selected electrical signal component of the electrical system during the indicated compression stroke, said tester comprising:

(a) a comparatively small, tubular body having an internal bore therein, and a single inlet at one end of said internal bore;

(b) a tip end of the tubular body carrying a flexible, resilient tip thereon which is fittable into the spark plug bore of the engine cylinder with a gas tight fit, with said single inlet being at this tip end for communication between the cylinder and said internal bore of said body;

(c) a flexible, resilient, impervious diaphragm mounted within said tubular body adjacent the end opposite said tip and separating said internal bore into a large working pressure chamber, and an enclosed small ambient pressure chamber sealed from said working pressure chamber, said working pressure chamber being in communication with said single inlet and being otherwise substantially imperforate, whereby gas and air entering said working pressure chamber from said engine cylinder cannot escape, and the outer end of said enclosed ambient pressure chamber being closed by an end wall;

(d) a pressure responsive switch means in said enclosed ambient pressure chamber, and comprising: a first contact carried by said diaphragm and facing toward said end



wall; and a second contact mounted within said enclosed ambient pressure chamber to confront said first contact in spaced relationship, and arranged to be engaged thereby in response to an increase of pressure within said working pressure chamber effective to move said diaphragm sufficiently toward said end wall;

(e) a first lead connected at one end thereof with said first contact; and

(f) a second lead connected at one end thereof with said second contact, one of said first and said second leads being connectable with the power source of said electrical system and the other thereof being connectable with a signal component, whereby to actuate such signal component whenever said first and said second contacts of said switch means are closed in response to sufficient pressure from said engine cylinder.

4,088,012

FUEL INJECTION METERING SYSTEM

Reginald Stanley Emerson, Buckingham, England, assignor to Leslie Hartridge Limited, England

Filed Feb. 25, 1977, Ser. No. 772,295

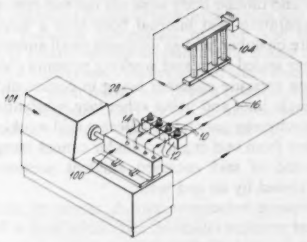
Claims priority, application United Kingdom, Mar. 1, 1976, 8108/76

Int. Cl.² G01F *9/00*

U.S. Cl. 73—119 A **4 Claims**

1. In metering apparatus for measuring the quantity of fuel oil delivered by engine fuel-injection means when being tested on a testing machine associated with said metering apparatus, the improvements wherein the apparatus comprises a plurality of at least partly transparent graduates, a displaceable piston within each graduate, each such piston having a leak-proof sliding fit with the respective graduate whereby no fuel oil is able to flow through the graduates, fuel oil supply passages connected to said graduates on one side of each piston to displace the pistons in one direction by fuel oil delivered from engine fuel-injection means under test, and further liquid supply passages connected to said graduates on the other side of each piston to displace the pistons in the other direction by

liquid delivered from a source of supply, the pistons in the graduates being readily visible so as to give a direct and accu-



rate reading of the quantity of fuel oil delivered to each graduate.

4,088,013

MAGNETO-ELASTIC TRANSDUCER

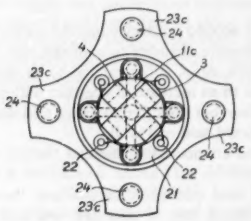
Orvar Dahle; Folke Von Knorring; Jan Nordvall, and Sture Siby, all of Vesteras, Sweden, assignors to ASEA Aktiebolag, Vesteras, Sweden

Continuation of Ser. No. 633,844, Nov. 20, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,806

Claims priority, application Sweden, Nov. 22, 1974, 7414683

Int. Cl.[2] G01L *5/00*

U.S. Cl. 73—141 A **8 Claims**



1. A magneto-elastic transducer for measuring strain in a mechanically loaded object, comprising:

a core of magneto-strictive material including windings for generating a magnetic flux in the core and for sensing the changes in the flux which occur when the core is affected by mechanical forces, said core being made of a single plate in the form of a cross with four mutually perpendicular arms, said arms being joined together at one of their respective ends, the other ends being provided with enlarged end surfaces;

a cup-shaped casing including a shoulder for supporting said enlarged end surfaces, said end surfaces being fastened to the shoulder by welding, said cup-shaped casing being provided with at least one pair of force-transmitting lugs for fastening the transducer to the loaded object.

4,088,014

MASS AND FORCE METER

Armin Wirth; Johannes Wirth, and Mario Gallo, all of Zurich, Switzerland, assignors to Wirth, Gallo & Co., Switzerland

Filed Jan. 12, 1976, Ser. No. 648,366

Claims priority, application Switzerland, Apr. 1, 1975, 00413/75

Int. Cl.[2] G01L *1/10*

U.S. Cl. 73—141 R **7 Claims**

1. A mass and force meter comprising

a frame,

a load support,

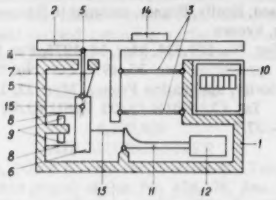
digital evaluation and display means mounted on said frame,

a force distributor,

first and second strings, each having one end attached to said force distributor at spaced apart locations,

a first transmission element attached to said force distributor, said first transmission element transmitting a pre-tensioning force to said force distributor for pre-tensioning said first and second strings,

a second transmission element attached to said force distributor for transmitting a force depending on the load placed on said meter, the longitudinal axes of said first and second strings and said first and second transmission elements not



intersecting at a common point thereby distributing the forces exerted thereby over said force distributor, said strings vibrating transversely when electrically excited,

means for applying to the evaluation and display means resultant frequency variations caused by the application of said forces to said strings for computation and display of the magnitude of said load, and

a guide having one end connected to said frame and its other end connected to said force distributor, said guide and said strings guiding said force distributor in a statically defined way relative to said frame with respect to said pre-tensioning force and said force depending on the load to be measured.

4,088,015

FORCE MEASURING APPARATUS WITH MOUNTING ARRANGEMENT

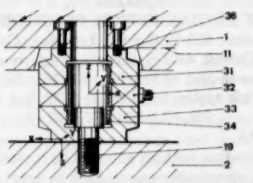
Peter Wolfer, Kleinandelfingen, Switzerland, assignor to Kistler Instrumente AG, Switzerland

Filed Sep. 23, 1976, Ser. No. 725,724

Claims priority, application Switzerland, Sep. 26, 1975, 012489/75

Int. Cl.[2] G01L *1/16*

U.S. Cl. 73—141 R **19 Claims**



1. A force measuring apparatus with a mounting arrangement for incorporation between a force receiving plate and a base plate of a force measuring system, said force measuring apparatus having an axis extending substantially transversely to said force receiving plate and base plate and provided with two force transmitting flange means having planar parallel mounting surfaces at the ends thereof, said flange means being arranged for receiving mounting screws for mounting said force measuring apparatus in the assembled condition thereof from the same side to and between said force receiving plate and said base plate and symmetrically with respect to the axis of said force measuring apparatus, said force measuring appa-

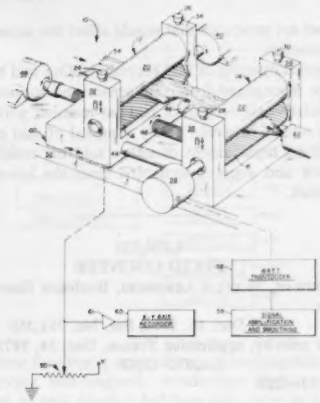
ratus having force transmission surfaces coinciding with said mounting surfaces, said force measuring apparatus comprising four modular components, said modular components including an electromechanical force measuring ring, said two force transmitting flange means and a central tubular pretensioning member, said force transmitting flange means having said planar parallel end surfaces provided with the smallest cross-sectional dimension sufficient for the lines of force caused by the mounting screws and the lines of force caused by the forces to be measured to extend along substantially the same path.

4,088,016

METHOD AND APPARATUS FOR DETERMINING PARAMETERS OF A STAPLE LENGTH DISTRIBUTION OF FIBERS IN YARN SLIVERS

Robert L. Watson, Kingsport, and Donald L. Finley, Mt. Carmel, both of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 11, 1977, Ser. No. 814,563
Int. Cl.² G01L *5/04*; D01H *5/44*
U.S. Cl. 73—160 **7 Claims**



1. An improved method for determining parameters of a staple length distribution of fibers in a yarn sliver wherein an elongate length of yarn sliver is being fed to and through a first pair and a second pair of drafting rolls each spaced apart from each other and the second pair rotating at a greater speed than said first pair, and wherein also a signal representative of the drafting force exerted upon the sliver at any one time is continuously generated and fed as an input of measurement to a recorder; the improved method comprising:

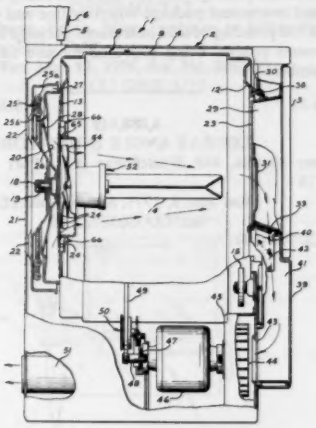
1. initially spacing the pairs of drafting rolls apart from each other at a distance greater than the longest fiber lengths in said yarn sliver;
2. then moving one of the pairs of drafting rolls toward the other pair of drafting rolls until first the longer fibers and then the shorter fibers in the yarn sliver extending between said drafting roll pairs bridge the gap between the nips of the two pairs of drafting rolls;
3. feeding the signal representative of the drafting force to the Y-axis of a X-Y recorder;
4. continuously measuring the continuing changing distance between the drafting roll pairs and generating as a consequence a signal representative of said continuing changing distance and feeding said signal as an input to the X-axis of said X-Y recorder; and
5. drawing a drafting force curve representative of said parameters on said X-Y recorder from said Y-axis and X-axis signal inputs.

4,088,017

CLOTHES DRYER AIR FLOW TEST DEVICE AND METHOD

Laurence T. Olges, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Feb. 23, 1977, Ser. No. 771,538
Int. Cl.² G01M *19/00*
U.S. Cl. 73—168 **11 Claims**



1. A device for checking the adequacy of the rate of air flow in a rotating clothes dryer drum having air flow through perforations in the rear wall of the drum comprising:

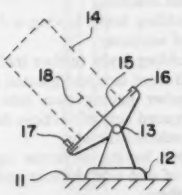
(a) a rotatable fan,
(b) a counter assembly arranged and including means to register the number of revolutions of the fan,
(c) means to removably attach the device to the rear wall of the drum over at least some of the perforations in the rear drum wall,
(d) a circular shroud member having a perforated rear wall and a depending circumferential wall around the fan, and
(e) a resilient gasket attached to the depending wall of the shroud member to act as a seal between the shroud member and rear wall of the drum.

4,088,018

MAGNETIC SUSPENSION AND POINTING SYSTEM

Willard W. Anderson, Yorktown, and Nelson J. Groom, White Marsh, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Division of Ser. No. 662,182, Feb. 27, 1976. This application Jun. 17, 1977, Ser. No. 807,703
Int. Cl.² G01C *21/00*
U.S. Cl. 73—178 R **6 Claims**



1. Apparatus for providing accurate pointing for carrier

vehicle instruments and for providing isolation from the vehicle comprising:

a first gimbal attached to and supported by said carrier vehicle;

a second gimbal mounted on said first gimbal;

an instrument package; and

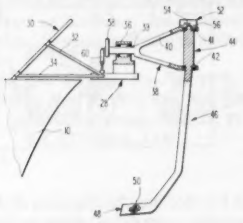
means supporting said instrument package and mounted on said second gimbal for magnetically suspending said instrument package and for fine controlling the pointing of said instrument package whereby fine and coarse control of the pointing of said instrument package is provided the coarse control being provided by said first and second gimbals.

4,088,019

LEEWAY ANGLE INDICATOR

Anthony Mascia, 445 Westchester Ave., Port Chester, N.Y. 10573

Filed Jun. 9, 1977, Ser. No. 805,112
Int. Cl.² G01C *21/00*
U.S. Cl. 73—180 **13 Claims**



1. Apparatus for ascertaining the true leeway angle of a moving vessel, comprising:

a submersible vane;

vertical pivot means for rotatably supporting said vane and defining a first axis of rotation thereof;

horizontal pivot means for rotatably supporting said vane;

attitude control means coupled to said vane for maintaining said first axis of rotation of said vane in a vertical plane regardless of variations in the attitude of the vessel; and

means for producing a manifestation of the leeway angle of the vessel as a function of the angular dispostion said vane.

4,088,020

VORTEX FLOWMETER APPARATUS

George E. Sgourakes, Millis, Mass., and Robert C. McCullough, Cumberland, R.I., assignors to The Foxboro Company, Foxboro, Mass.

Filed Mar. 14, 1977, Ser. No. 777,210
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **10 Claims**

1. Flowmeter of the vortex-shedding type, comprising:

a conduit for carrying a flowing fluid, said conduit having an opening through one wall;

a vortex-shedding body extending substantially across the interior of said conduit;

said vortex-shedding body having a front face producing spaced sets of vortices;

said vortex-shedding body further including a bar-member joined to said front face and located downstream thereof, said bar-member having two side surfaces positioned within said spaced sets of vortices for receiving pressure variations produced thereby;

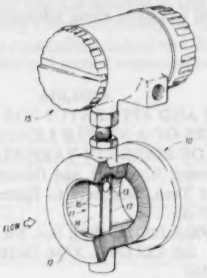
said bar-member having a recess opening out laterally through one of said side surfaces and the adjacent end of said bar-member;

a vortex sensor positioned in said recess to sense through said lateral opening said pressure variations;

a support structure integral with said sensor within said recess and extending through said end opening and through said conduit opening;

means outside of said conduit for securing said support structure to said conduit, thereby firmly holding said sensor and said support structure within said recess;

said recess being formed to receive said sensor and said support structure such that at least in the area of said bar-member containing said sensor no spurious pressure



pulses are produced that would affect the accuracy of said flowmeter;

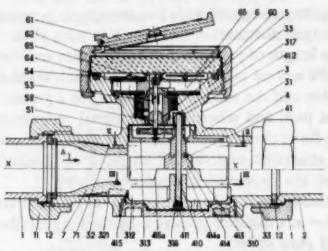
said lateral opening of said recess enabling said bar-member to be disengaged from said sensor and support structure by relative movement of said bar-member with respect to said sensor, whereby ready removal of said bar-member facilities replacement of either said bar-member or said sensor and support structure from the interior of said conduit.

4,088,021

FLUID COUNTER

André Farnier, 76 rue d'Aguesseau, Boulogne Hauts de Seine, France

Filed Dec. 16, 1976, Ser. No. 751,245
Claims priority, application France, Dec. 24, 1975, 75 39701
Int. Cl.² G01F *1/07*
U.S. Cl. 73—229 **7 Claims**



1. A fluid counter comprising:

a sensor having a chamber and a bladed rotor disposed therein;

said bladed rotor being rotatable by fluid passing through said sensor;

means for counting and displaying the amount of rotary motion of said rotor and thereby the amount of fluid passing through said sensor;

transmission means for transmitting the rotary motion of said rotor to said counting and displaying means;

said rotor including a shaft and a plurality of blades extending therefrom;

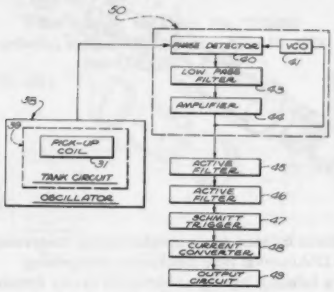
one end of said shaft terminating in a point and the other end of said shaft being flat;

one end of said shaft being received within a bearing;
a stop member disposed adjacent each end of said shaft;
the distance between said stop members being slightly greater than the distance between the ends of said shaft;
said pointed end of said shaft contacting its adjacent stop member when fluid at a low flow rate passes through said sensor and said flat end of said shaft moves into contact with its adjacent stop member when fluid at a high flow rate passes through said sensor;
a hub secured about said shaft;
said blades extending radially from said hub and
the height of each blade being approximately twice the height of said hub and the lower edge of said hub being located approximately in a plane passing through the median of said blades.

4,088,022
TURBINE FLOWMETER AND COMPONENTS THEREOF

Paul Z. Kalotay, Monrovia, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 25, 1975, Ser. No. 553,024
Int. Cl.² G01F 1/115
U.S. Cl. 73—231 R **4 Claims**



1. A turbine flowmeter comprising: a non-magnetic conduit; a rotor having non-magnetic conductive blades; mounting means fixed in said conduit holding said rotor in a position rotatable in response to a flow of fluid in said conduit; an input oscillator including a tank circuit having a coil and an output, said coil being fixed relative to said conduit outside thereof and having an axis extending generally normal to the length of said conduit in a position such that all of said blades pass one end of said coil when said rotor is turned one revolution; a phase lock loop having an input and an output, the output of said input oscillator being connected to the input of said phase lock loop, said phase lock loop producing a time varying signal at its output when a blade passes said coil; and output means connected from said phase lock loop output for producing a pulse each time a blade passes said coil.

4,088,023
LIQUID LEVEL GAUGE

Albert J. Berleue, Bradford, and William H. Dumbaugh, Jr., Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

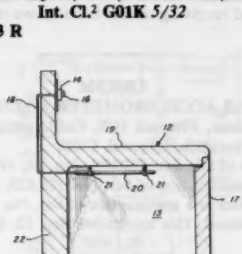
Continuation of Ser. No. 452,196, Mar. 18, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,665
Int. Cl.² G01F 23/02; C03C 3/04
U.S. Cl. 73—334 **8 Claims**

1. In a gauge for exhibiting the liquid level in a container of alkaline liquid, the improvement which comprises including in said gauge a glass component that is exposed to the alkaline liquid, which glass, when treated in a 5% by weight NaOH solution at 95° C. for six hours, demonstrates essentially no change in appearance and a weight loss of no more than about 0.03 mg/cm², said glass component consisting essentially, in percent by weight on an oxide basis, of 20–50% SiO_2, 3–40% Y_2O_3, 5–25% of a divalent metal oxide selected from the group consisting of the alkaline earth metal oxides and ZnO, and 0–30% Al_2O_3.

4,088,024
COMBINATION MICROWAVE-THERMAL OVEN THERMOSTAT

David Alan Baron, Edina, Minn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 17, 1976, Ser. No. 686,999
Int. Cl.² G01K 5/32
U.S. Cl. 73—343 R **13 Claims**

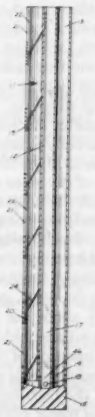


1. In a combination cooking oven of the type adapted to cook foods by the simultaneous application of thermal energy and microwave energy, and including a thermostatic control having a bulb element located in the oven for sensing and controlling the temperature therein, the improvement wherein said bulb element has a surface portion comprised of an electrically conductive, oxidation resistant metal having a melting point in excess of 1000° F.

4,088,025
MATERIAL SAMPLING APPARATUS

Bill D. Foster, Ankeny; John T. Comiskey, Johnston, and LeRoy H. Degner, Des Moines, all of Iowa, assignors to Elevator Contractors, Inc., Des Moines, Iowa

Filed Jun. 15, 1977, Ser. No. 806,737
Int. Cl.² G01N 1/10
U.S. Cl. 73—423 R **14 Claims**



1. Apparatus comprising:

means for receiving a sample of material, said receiving means having an outlet;

a vacuum tube on one side of said sampling device, said vacuum tube having an opening at the bottom thereof;

vacuum means connected to said vacuum tube for creating a negative pressure in said vacuum tube;

connecting chamber means for connecting the receiving means outlet with said vacuum tube opening; and

means connected to said receiving means below said receiving means opening for permitting air to enter said connecting chamber means whereby a jet of air is formed under the outlet in said receiving means and traverses said connecting chamber means to the vacuum tube causing material in said receiving means to be drawn into said vacuum tube.

4,088,026

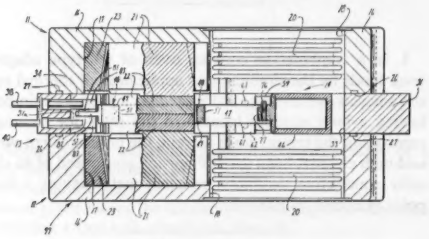
LINEAR ACCELEROMETER MECHANISM

Philip D. Flanner, Pleasant Hill, Calif., assignor to Systron-Donner Corporation, Concord, Calif.

Continuation of Ser. No. 482,659, Jun. 24, 1974, abandoned, which is a continuation of Ser. No. 289,423, Sep. 15, 1972, abandoned, which is a continuation of Ser. No. 47,346, Jun. 18, 1970, abandoned. This application Sep. 15, 1975, Ser. No. 613,449

Int. Cl.[2] G01P *15/08*

U.S. Cl. 73—497 **23 Claims**



1. In a linear accelerometer mechanism, a housing, a pendulous member, a torque coil carried by said pendulous member, a conducting planar element carried by the pendulous member, pick-off means mounted within the housing in the vicinity of the planar element, means for pivotally mounting said pendulous member in said housing, said mounting means including first and second spaced cantilevered supports mounted within the housing, means for pivotally mounting the pendulous member on the free ends of the spaced cantilevered supports, adjustable means for applying a predetermined preload force to the cantilevered supports, said last named means including spring means engaging the free ends of the cantilevered supports, and means for adjusting the force applied by the spring means to the cantilevered supports.

3. In a linear accelerometer mechanism, a housing, a pendulous moving system assembly comprising a float, lever arm means with one end secured to the float, a torque coil assembly secured to the other end of the lever arm means and a conducting element movable with the torque coil assembly, pivot and bearing means for pivotally mounting the pendulous moving system assembly within the housing about a predetermined pivot axis, a liquid in said housing in which said moving system is disposed, said float being of a size so that the moving system is substantially neutrally buoyant, said moving system being assymetric geometrically about the pivot axis with the lever arm means, the torque coil assembly and the conducting element being disposed on one side of the pivot axis and defining a pendulum having a pendulum axis at right angles to the pivot axis, a major portion of the float being disposed on the other side of the pivot axis, said major portion of the float serving to position the center of buoyancy of the moving system, said float being mounted eccentrically of the pivot axis in a direction away from the torque coil assembly so that the center of buoyancy of the pendulous moving system is positioned so that it is spaced from but is near to the pivot axis by a predetermined distance and pick-off means mounted within the housing in the vicinity of the conducting element, the center of mass of the pendulous moving assembly assembly being displaced from the pivot axis by a distance greater than the dimension of the float along the pendulum axis.

4,088,027

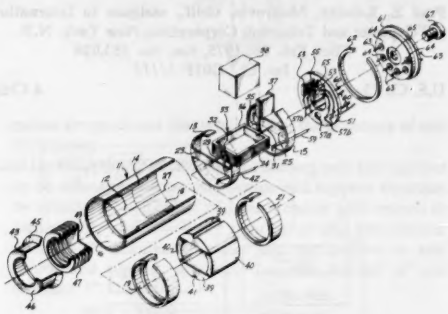
FORCE BALANCE SERVO ACCELEROMETER

E. Norman Hernandez, 1615 Windmere Dr. E., Seattle, Wash. 98112, and F. Daric Gichard, 1356 W. Armour, Seattle, Wash. 98119

Filed Sep. 29, 1976, Ser. No. 727,810

Int. Cl.[2] G01P *15/08*

U.S. Cl. 73—517 B **41 Claims**



1. A force balance servo accelerometer comprising:

(A) a D'Arsonval type mechanism comprising:

(1) a housing having an elongate cavity formed therein, said cavity having a central longitudinal axis:

(2) a pair of spaced suspension beams mounted in said cavity so as to pass orthogonally through said central longitudinal axis;

(3) a pair of taut wires, one end of each of said taut wires being attached to one of said pair of spaced suspension beams, said taut wires projecting toward one another;

(4) a torque coil affixed to the adjacent ends of said taut wires;

(5) a permanent magnet mounted in said cavity in a position such that the magnetic field produced by said permanent magnet interacts with the magnetic field produced by said torque coil when a current flows through said torque coil;

(6) an arm affixed to said torque coil so as to project in a direction transverse to said central longitudinal axis;

(7) a seismic mass mounted on the outer end of said arm; and,

(8) sensing means mounted in said housing so as to sense the position of said seismic mass, said sensing means including a pair of coils; and,

(B) an electronic subsystem comprising:

(1) circuit means, connected to said pair of said sensing coils, for forming, in combination with said pair of sensing coils, a bridge circuit that is balanced when said seismic mass is in a predetermined null position;

(2) an oscillator connected across one pair of opposing terminals of said bridge circuit;

(3) difference means connected across the other pair of opposing terminals of said bridge circuit for producing an output containing information related to the difference in phase between the signals occurring at said other pair of opposing terminals;

(4) multiplying means connected to the output of said difference means and to said oscillator for multiplying the output of said difference means by the output of said oscillator; and

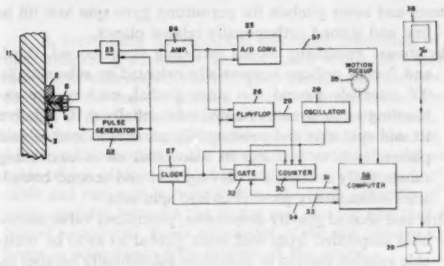
(5) connecting means for connecting the output of said multiplying means to said torque coil of said D'Arsonval type mechanism.

4,088,028

METHOD AND APPARATUS FOR ADJUSTING DEFECT SIGNAL GATE IN ULTRASONIC TEST CIRCUIT

Heiner H. G. Hildebrandt, Bensberg-Refrath, Germany, assignor to Krautkramer-Branson, Incorporated, Stratford, Conn.

Filed Mar. 9, 1977, Ser. No. 776,000
Claims priority, application Germany, May 10, 1976, 2620590
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—611 13 Claims



1. The method of testing by the ultrasonic pulse-echo method workpieces moving relative to a test probe means comprising:

providing relative motion between a test probe means and a workpiece to be tested;

periodically energizing said probe means for causing said probe means to transmit an ultrasonic search signal through a liquid coupling path into the surface of the workpiece and subsequently to receive at said probe means via said coupling path echo signals arising from an acoustic discontinuity encountered by the search signal along its path in the workpiece from the workpiece front surface to the workpiece rear surface and providing corresponding echo responsive electrical signals;

transmitting the echo responsive electrical signals for evaluation to an electrical receiver circuit which includes a defect signal gate;

measuring the transit time of the periodically transmitted search signal starting with the energization of said probe means and terminating with the receipt by said probe means of the workpiece rear surface responsive echo signal;

determining whether a variation in transit time between successive search signals is caused by a change in the length of the coupling path or a change in workpiece thickness, and

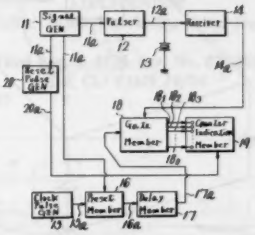
controlling said defect gate in response to such determination.

4,088,029

ULTRASONIC FLAW DETECTOR

Eiji Yamamoto, Tokyo, and Koji Ohta, Yokohama, both of Japan, assignors to Kabushikikaisha Tokyo Keiki, Tokyo, Japan

Continuation-in-part of Ser. No. 378,804, Jul. 13, 1973, abandoned. This application Mar. 22, 1976, Ser. No. 668,966
Claims priority, application Japan, Jul. 14, 1972, 47-70589
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—612 4 Claims



1. An ultrasonic flaw detector comprising:

(a) means including a signal generator for applying a transmitting pulse to a probe, said probe transmitting an ultrasonic wave to an object having a flaw to be detected;

(b) receiver means for receiving a reflected ultrasonic wave arriving at said probe from a flaw in the object being detected due to reflection of said transmitting ultrasonic wave from said flaw;

(c) gate circuit means including a gate signal generator which produces plural output signals, said plural output signals occurring without a gap from a preceding one of said signals, AND circuits, peak hold circuits and analog-digital converters, each of said AND circuits receiving the output signal from said gate signal generator sequentially, and an output signal from each of said AND circuits being supplied through each of said peak hold circuits to each of said analog-digital converters;

(d) means for coupling an output from said receiver means to said gate circuit means;

(e) clock pulse generating means for producing a clock pulse;

(f) preset means for receiving the clock pulse from said clock pulse generating means and said transmitting pulse from said signal generator and producing an output signal for a fixed count of clock pulses from said clock pulse generating means;

(g) delay circuit means coupled to an output of said preset means and producing a single output signal for each cycle of said signal generator, said single output signal being applied to said gate circuit means, said plural output signals from said gate signal generator being produced in response to said single output signal from said delay circuit means; and

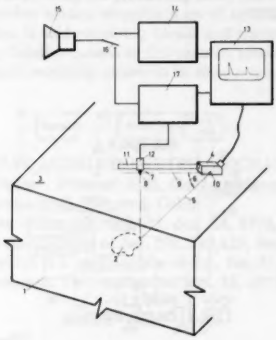
(h) counter indication means including latch circuits and display elements, each of said display elements receiving an output signal from each of said analog-digital converters through each of said latch circuits to give quantitative data concerning a flaw magnitude in said object being detected in response to measurements of said reflected ultrasonic wave.

4,088,030

APPARATUS FOR ULTRASONIC EXAMINATION

Sven Erik Iversen, Charlottenlund, and Svend Aage Lund, Birkerod, both of Denmark, assignors to Akademiet for de Tekniske Videnskaber, Svejsecentralen, Glostrup, Denmark

Filed Apr. 8, 1976, Ser. No. 675,073
Claims priority, application Denmark, Apr. 15, 1975, 1615/75
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—629 2 Claims



1. An apparatus for locating internal inhomogeneities in an otherwise homogeneous object, having a substantially plane or slightly curved surface, utilizing the pulse-echo method of ultrasonic examination comprising:

a probe which can be guided freely in two-dimensional movement across the surface of the object and can be freely rotated about an axis which is at a right angle to the plane of the surface, wherein the probe transmits ultrasonic pulses and receives reflected ultrasonic pulses in a path forming a predetermined angle, other than 90°, with the surface;

an ultrasonic circuit means coupled to the probe for producing and processing the ultrasonic pulses which are transmitted and received by the probe;

an acoustic emitter means for producing an audible sound signal;

a first control circuit means coupled to the ultrasonic circuit means and the acoustic emitter means for converting the received reflected ultrasonic pulses to a signal which continuously varies in intensity, frequency, or duration so that the acoustic emitter means produces an audible sound signal which varies in a continuous manner with the amplitude of the received reflected ultrasonic pulse;

an elongated holder affixed to the probe;

a positioned transducer slidably mounted on and movable relative to the holder in a direction along a straight line parallel to the projection of the pulse path on the surface;

an indicating means mounted on the positioned transducer for indicating the point on the surface which represents the projection of the inhomogeneity on the surface;

a two-position switch means for connecting the acoustic emitter means to said first control circuit means when said switch is in a first position; and

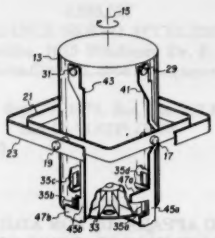
a second control circuit means coupled to said acoustic emitter means when said switch means is in a second position, said second circuit means being coupled to said ultrasonic circuit means and said positioned transducer for converting the received reflected ultrasonic pulses to a signal which continuously varies in intensity, frequency, or duration so that the acoustic emitter means produces an audible sound signal which varies in a continuous manner with the amplitude of the received reflected ultrasonic pulse when and only when said indicating means is located at a distance from said probe which has a given ratio to a total forward and return transit time of said ultrasonic pulses and reflected ultrasonic pulses, respectively.

4,088,031

AIR ERECTED GYRO

Leonard D. Sholes, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 31, 1977, Ser. No. 764,492
Int. Cl.[2] G01C *19/30, 19/52, 19/44*
U.S. Cl. 74—5.43 9 Claims



1. In an air erected vertical gyro having a spin axis and including:

inner and outer gimbals for permitting gyro spin axis tilt in first and second orthogonally related planes,

air stream producing means including first, second, third, and fourth orifices sequentially oriented at substantially 90° intervals around the inner gimbal, each orifice exhausting an air stream oriented substantially at 90° relative to said spin axis and substantially parallel to one of said planes, each orifice and its associated air stream being substantially rectangular having first and second boundaries substantially parallel to said spin axis,

first and second gravity-responsive, pendulous valve assemblies suspended from said inner gimbal so as to be rotatable relative thereto in directions substantially parallel to, respectively, said first and second planes,

said first and second valve assemblies including respectively first and second pairs of valve gates, each one of said first pair being associated with a different one of said first and third orifices, and each one of said second pair being associated with a different one of said second and fourth orifices,

each said gate, in response to its valve assembly's rotation relative to the inner gimbal, moving substantially orthogonally across the air stream from its associated orifice so as to variably confront said associated stream and thereby vary the associated air stream reaction force,

each said gate cooperating with its paired gate such that as one gate causes its associated air stream reaction force to increase, the paired gate causes its associated air stream reaction force to decrease,

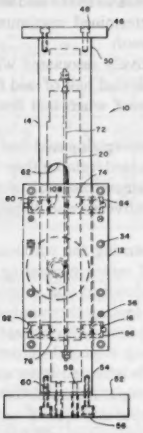
each said gate intersecting, when the gyro is fully erected, all or part of its associated air stream's first boundary without intersecting any part of its associated air stream's second boundary,

the improvement comprising four substantially flat surfaces individually associated with a different one of said four gates, each said flat surface connected for movement with its associated gate and for substantially orthogonally confronting a portion of the associated air stream not confronted by the associated gate, each said flat surface being configured to intersect, when the gyro is fully erected a part but less than all of the associated air stream second boundary.

4,088,032
SERVO HEAD STRUCTURE

Thomas J. O'Connor, Ann Arbor, Mich., assignor to Esco-Sparcatron, Inc., Ann Arbor, Mich.

Filed Feb. 24, 1975, Ser. No. 552,194
Int. Cl.[2] F16H *21/16*
U.S. Cl. 74—25 13 Claims

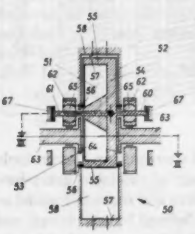


1. A servo head for electrical discharge machining or the like, comprising a frame, a ram positioned within the frame for movement with respect thereto, guide means operable between the frame and ram for guiding the ram in precision movement relative to the frame, a rotary motor secured to the frame, and cable drive means including a rotatable shaft secured in the frame and connected to the motor for rotation thereby and a cable which cable is secured to the ram at opposite ends of the cable and ram and is wound about the shaft centrally of the cable operable between the motor and ram for effecting controlled reciprocal , linear movement of the ram relative to the frame in accordance with rotation of the motor.

4,088,033
PISTON POWER GENERATING MACHINE

Ewald Harr, Heilbronner Strasse 19, Schwaigern 2, Germany (7103)

Filed Aug. 9, 1976, Ser. No. 712,644
Claims priority, application Germany, Aug. 9, 1975, 2535644
Int. Cl.[2] F16H *21/16*
U.S. Cl. 74—25 14 Claims

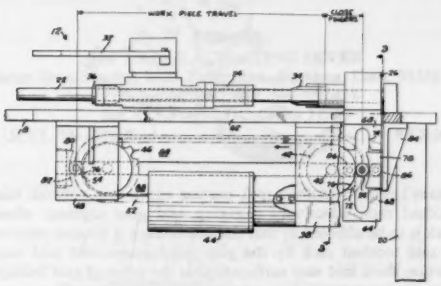


1. In a piston power generating machine having a housing which encloses a cylindrical working chamber, at least one piston mounted for reciprocating movement along the longitudinal axis of the working chamber, said piston being connected through the housing with an output mechanism, the improvement comprising said piston having a center of gravity eccentric to its longitudinal axis, said piston including a shaft element arranged substantially parallel to and offset from the longitudinal axis of the working chamber and a piston cover at least at one end of said shaft element, said piston cover having a cross-section substantially corresponding to the cross-section of the working chamber and guide means for rotatably mounting said piston about the longitudinal axis of said working chamber and for imparting rotational movement to said piston in response to the reciprocating movement thereof whereby the center of gravity of the piston is laterally spaced a substantial distance from the longitudinal axis of the working chamber.

4,088,034
CHAIN DRIVE FOR A WORKPIECE TRANSFER MECHANISM

Bernard J. Wallis, 25200 Trowbridge Ave., Dearborn, Mich. 48124

Filed Apr. 2, 1976, Ser. No. 672,983
Int. Cl.[2] F16H *19/06*
U.S. Cl. 74—37 9 Claims



1. In a reciprocating drive mechanism of the type comprising an endless chain extending around a pair of sprockets mounted on a support with their axes in spaced parallel relation, a drive member fixed to said chain for movement therewith in an endless path around said sprockets, said drive member extending transversely of the chain on an axis parallel to the axis of rotation of the sprockets, and a driven member operably connected with said drive member and mounted on said support for reciprocation in response to displacement of said drive member along the path of travel of said chain, the stroke of said driven member being determined by the displacement of said drive member in the direction of a line extending between and perpendicular to the axes of said sprockets, the improvement which comprises, a pair of radially spaced inner and outer guide tracks adjacent each sprocket concentric to the axes of rotation of the sprockets, said guide tracks being spaced radially from the axes of rotation of the sprockets, the radial spacing between said tracks being such that the drive member engages each guide track and has a close fit therebetween as it travels around each of the sprockets.

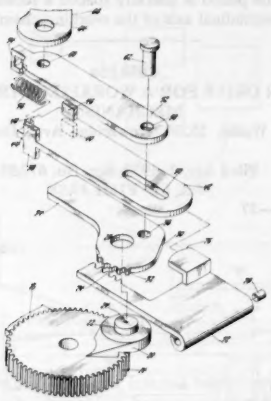
4,088,035
WINDSHIELD WIPER DRIVE MECHANISM WITH DEPRESSED PARKING

Roy C. Bodem, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 15, 1975, Ser. No. 613,258
Int. Cl.[2] F16H *21/40*
U.S. Cl. 74—70 4 Claims

1. A windshield wiper drive mechanism having an input member that continuously rotates during wiping, an output crank member driven in wiping oscillation through a predetermined arc during wiping and driven outside one limit of the predetermined arc for parking, and lever means for connecting said input member to said output crank to convert the rotary input motion to oscillating output motion during wipe and upon conclusion of wipe driving the output member to the

park position, wherein the improvement comprises; a linkage transmission means having a plurality of linkage components operatively interconnected and spring loaded to establish a predetermined length between said input member and said output crank member during wiping to effect said predetermined arc, including a gear segment formed on one of said linkage components and a stop surface formed on another of said linkage components; and selectively operable parking



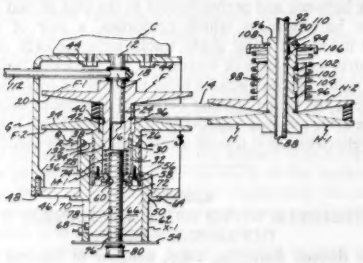
means having a toothed rack portion and a stop portion, said toothed rack selectively engaging said gear segment when park is to be effected so that the one linkage is rotated relative to said toothed rack by the gear engagement and said stop portion abuts said stop surface so that the other of said linkage components is rotated to a lesser degree by the gear engagement and abutment with the stop surface so as to establish positioning of the output crank member outside the limit of the predetermined arc.

4,088,036

POWER DRIVE TRANSMISSION ASSEMBLY

Darrel D. Hillman, Santa Ana, Calif., assignor to Electromatic Drive Corporation, Fort Worth, Tex.

Filed Nov. 5, 1975, Ser. No. 629,090
Int. Cl.² F16H *55/56*; G01P *3/36*; F16H *9/18*
U.S. Cl. 74—230.17 A **27 Claims**



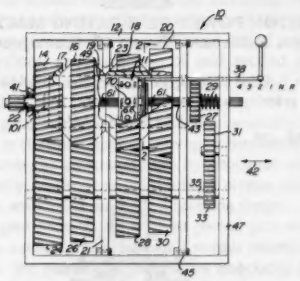
1. A power drive assembly comprising:
an endless V-belt;
a rotatably supported first shaft;
a rotatably supported second shaft spaced from said first shaft and parallel thereto;
a first pulley defined by first and second halves, said first half being rigidly secured to said first shaft and said second half being slideably mounted on said first shaft but nonrotatable relative thereto;
a second pulley defined by first and second halves, said first half of said second pulley rigidly secured to said second shaft, and said second half of said second pulley slideably mounted on said second shaft and slideably nonrotatable relative thereto;
force exerting means that tends to maintain said second half of said second pulley in a position relative to said first half thereof such that the effective pitch diameter of said second pulley is a maximum;
spring means that tends to move said second half of said first pulley to a predetermined maximum spacing relative to said first half thereof;
a first means operatively associated with said spring means for moving said second half of said first pulley relative to said first half thereof when said first means is energized; and
a second means for energizing said first means in accordance with a predetermined relationship thereby varying the effective pitch diameter ratio of said first pulley and said second pulley relative to said V-belt, said second means comprising:
third means for sensing the rotational speed of said first shaft, said third means generating a first output whose magnitude is related to said rotational speed;
fourth means for sensing the relative position of said second half of said first pulley to said first half, said fourth means generating a second output whose magnitude is related to said relative position; and
fifth means for comparing the difference in the magnitude of said first output and second output and generating a third output to energize said first means to move said second half relative to said first half to vary the effective pitch diameters of said first and second pulley until said first and second outputs are equal.

4,088,037

TRANSMISSION SYSTEM

Thomas M. Carr, Ardmore, Pa., assignor to Philip Lunney, Ardmore, Pa.

Filed Jul. 29, 1976, Ser. No. 709,702
Int. Cl.² F16H *3/08*
U.S. Cl. 74—371 **16 Claims**



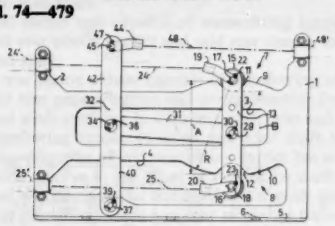
1. An improved transmission system including:
(a) at least a pair of rotatable gears having longitudinally registering bores and recesses formed within an inner wall of said gears defined by said bores; and,
(b) shift and clutch means slideably actuated within said bores for providing in sequence (1) frictional engagement of said shift and clutch means to said inner wall of one of said gears to effect synchronization thereof responsive to longitudinal displacement of said shift and clutch means, and then (2) positive engagement of said shift and clutch means to one of said gears when said shift and clutch means is longitudinally displaced through a predetermined linear displacement within said bores.

4,088,038

DEVICE FOR CONNECTING EITHER ONE OF TWO ALTERNATIVE OPERATING MEMBERS WITH AN OPERATED MEMBER

Cornelis Paul, Dordrecht, Netherlands, assignor to AB Volvo Penta, Gothenborg, Sweden

Filed Dec. 7, 1976, Ser. No. 748,324
Int. Cl.[2] G05G *11/00*
U.S. Cl. 74—479 10 Claims



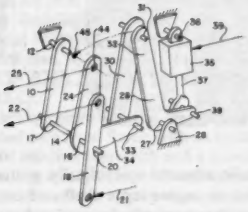
1. A device for connecting either one of two alternative operating means, each of which comprises an elongated incoming operating member (24, 25) with axial operating movement, to a means intended for operation, which likewise has an elongated axially movable outgoing operating member (48), especially to couple either one of two gear shift control cables (24, 25) to an operating cable (48) leading to the gear shift mechanism of a boat motor, characterized in that the device comprises a frame (1,50;52); that the incoming operating members (24, 25) are connected to individual end portions of a link arm (13,14;65) which is pivotably and displaceably guided in its plane in the frame; that the outgoing operating member (48) is directly or indirectly pivotably connected to the central portion of the link arm; that both end portions of the link arm (13,14;65) have cam engaging means (15,16;66,67) disposed to cooperate with individual cams (7,8;59,60) in the frame, which cams extend essentially transverse to the longitudinal direction of the link arm and are shaped as mirror images of one another and each has a valley (11,12;63,64) surrounded by higher cam curve portions (9,10;61,62); and that the distance (B) between the cam engaging means (15,16;66,67) of the link arm (13,14;65) is so chosen in relation to the distance between the valleys of the cam curves and to their depth that either one, but not both, of the end portions of the link arm with associated cam engaging means (15,16;66,67) can be swung out of the associated cam valley (11,12;63,64) while the cam engaging means (16,15;67,66) at the opposite end of the link arm engages the associated cam valley (12,11;64,63) and forms the pivoting center of the link arm.

4,088,039

RATIO CHANGING MECHANISM

Per Axel Bolang, Bellevue, and Alan Bartholomew Cairns Dawson, Mercer Island, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 14, 1977, Ser. No. 768,341
Int. Cl.[2] G05G *1/04*
U.S. Cl. 74—479 5 Claims



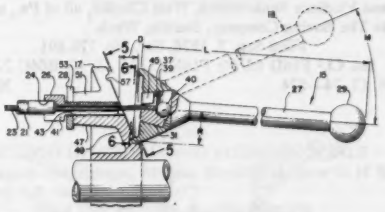
1. A ratio changing mechanism for combining mechanical input signals, said mechanism comprising a first link having one end pivotally mounted on a fixed support, a first crank member having a pivot point mounted on the other end of said first link and having two arms, a second link pivotally mounted on the pivot point of said first crank member and adapted to have said mechanical input signals applied thereto, means for transmitting an output signal from one of said arms of the first crank member, a second crank member having a pivot point mounted on a fixed support, a third link having one end pivotally attached to the other arm of the first crank member and the other end pivotally attached to one arm of said second crank member, and means for moving the other arm of the second crank member to adjust the ratio of the output signal to the combined input signals.

4,088,040

360° CABLE ACTUATING LEVER

Brian Ross-Myring, 8822 Zeller Ave., Pacioma, Calif. 91331

Filed Jan. 3, 1977, Ser. No. 758,871
Int. Cl.[2] F16C *1/10*; G05G *11/00*
U.S. Cl. 74—501 R 9 Claims



1. A device for actuating control cables on a handle bar equipped vehicle comprising:

a bracket to be attached to the handle bar of a vehicle;

means for mounting a control cable actuating lever to said bracket including means for allowing said lever to rock in any angular direction on an annular pivot in response to manually applied control forces and also for allowing rocking motion in any angular direction by said lever without damage to said lever in response to randomly directed accident forces; and

means for attaching a vehicle control cable to said lever to actuate said cable upon rocking said lever from its static rest position in any angular direction on said annular pivot.

4,088,041

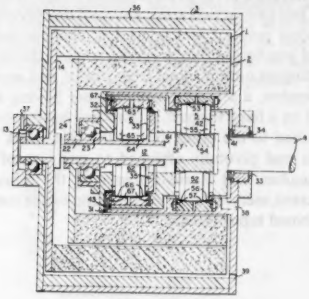
ENERGY STORING FLYWHEEL DRIVE

Charles E. Kraus, Austin, Tex., assignor to Incelermatic, Inc., Austin, Tex.

Filed Dec. 13, 1976, Ser. No. 750,363
Int. Cl.[2] G05G *1/00, 3/00*; F16H *15/50*
U.S. Cl. 74—572 15 Claims

1. An energy storing flywheel drive, comprising: a housing; a flywheel rotatably supported in said housing; and input-output drive means for supplying energy to, and retrieving it from,

said flywheel, said input-output drive means including a planetary type traction roller transmission mounted in said housing



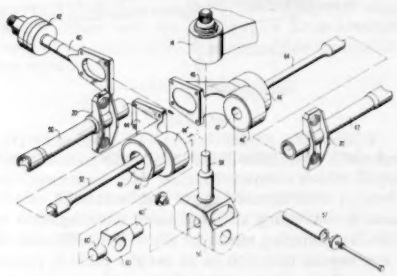
so as to form also a bearing for rotatably supporting said flywheel.

4,088,042

VIBRATION ISOLATION SYSTEM

Rene A. Desjardins, Media; Charles W. Ellis, Newtown Square, and Vladimir Sankewitsch, West Chester, all of Pa., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 7, 1976, Ser. No. 720,601
Int. Cl.[2] F16D *63/00*; F16F *15/04, 15/10*; B64C *27/00*
U.S. Cl. 74—574 **20 Claims**



1. A vibration isolation system for connecting a body to a vibrating mass with minimum transfer of vibration therebetween comprising, in combination:

coupling means for connecting said vibrating mass to said body at a plurality of points, said coupling means including at each of said points:

a weighted lever arm;

first pivot means for pivotally joining said mass to said lever arm at a first pivot location displaced from the center of gravity of said arm;

second pivot means for pivotally joining said body to said lever arm at a second pivot location between said first pivot location and said center of gravity; and

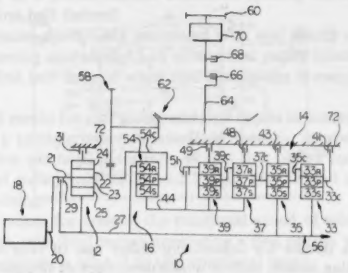
torsion spring means connected to said lever arm for transmitting vibratory forces to said body from said vibrating mass via said pivot means whereby inertial forces generated by vibration-induced displacement of said lever arm are applied to said body through said second pivot means in opposition to vibratory forces of a first predetermined frequency coupled to said body through said torsion spring such that said body is substantially isolated from vibratory motion in response to said vibratory forces of said first predetermined frequency.

4,088,043

DIRECT DRIVE TRANSMISSION

Lowell E. Johnson, East Peoria; Gerald B. Ireland, Morton, and Marvin L. Schneider, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 2, 1976, Ser. No. 654,430
Int. Cl.[2] F16H *3/44, 37/06, 37/08, 57/10*
U.S. Cl. 74—681 **12 Claims**



1. A multi-speed transmission for an engine driven vehicle comprising:

an input shaft;

forward-revrse drive means drivingly operable by the vehicle engine for rotaing said input shaft in one or the other directions;

an epicyclic torque-splitting gear arrangement having an input member driven by the input shaft, an output member, and a reaction member;

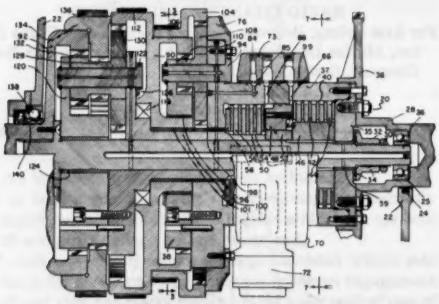
speed reduction means also driven by said input shaft and selectively controllable for (i) rotating said reaction member in the same one direction relative to the direction of rotation of said input shaft, (ii) stopping rotation of said reaction member, or (iii) rotating said reaction member in the other opposite direction relative to the direction of rotation of said input shaft.

4,088,044

MANUALLY CONTROLLED SEMI-AUTOMATIC STEP GEAR TRANSMISSION

Oliver E. Taintor, 7 Lynack Rd., Hawthorne, N.J. 07506

Division of Ser. No. 642,812, Dec. 24, 1975. This application Feb. 7, 1977, Ser. No. 766,162
Int. Cl.[2] F16H *57/10*
U.S. Cl. 74—765 **15 Claims**



1. In hydraulic actuated epicyclically geared power transmissions having an engine input shaft and output load shaft, annulus gears with power cylinder and band control means and pinion gear clusters the combination comprising:

a forward transmission section dual clutch unit and inte-

grated forward pinion carrier and related gear clusters receiving driving power from said engine shaft;

a main transmission shaft integrated with said load shaft and in communication with said dual clutch unit;

a rearward transmission section pinion carrier including a shaft projection in communication with said dual clutch unit and having pinion gear cluster means in communication with said load shaft and annulus gear supported on said load shaft;

a dual clutch unit capable of transmitting torque through said rear pinion carrier and said rear cluster to drive said load shaft;

said rear pinion cluster capable of transferring torque from said rear pinion carrier and giving reactive force to said load shaft resulting in a reverse gear ratio and capable of transferring torque to cause said load shaft to turn the same direction as said rear pinion carrier but at a reduced speed relative to the speed of the engine shaft;

a dual annulus gear in communication with said forward gear cluster and with said rear cluster to transmit torque from the forward transmission section to the rear section;

means in communication with said rear carrier to lock said dual annulus and rear transmission carrier in step causing rotation as a unit at a reduced speed relative to the engine shaft, the reduction being in proportion to the ratio of said forward pinion cluster gears resulting in a second gear ratio;

said dual clutch being capable of transmitting torque to said rear pinion carrier to unlock said forward and rear sections, resulting in a third gear ratio which is a higher ratio than said second gear ratio; and said dual clutch unit capable of transmitting torque through said main shaft to said load shaft causing direct drive;

said power transmission gearing system having an hydraulic servo-system to activate the proper gearing combinations supplied by a pump and having a main oil line to supply a distribution valve to annulus gear power cylinder controls and dual clutch unit further comprising:

a compensating fluid pressure and spring compression variable pressure regulation means governing annulus control power cylinder by actuating fluid pressure at idling speeds by momentarily restricting oil flow to said distribution valve;

fluid pressure versus spring compression differential-piston regulator means sensitive to main line gear actuating pressure to maintain main line pressure within a desired operative range; and

said variable pressure regulator providing a system of compensating fluid versus spring pressures to provide an operating

pressure range at the distributor valve, as a linear function of pump discharge, of five to one hundred percent of main line pressure for the engine speed range of idle to fast idle thereby resulting in a gradual initiation of said gearing combinations and eliminating the need for a conventional clutch.

4,088,045

PLANETARY WORK FORMING MACHINE HAVING IMPROVED STARTER TIMING CONTROL AND STARTER DRIVE SELECTOR

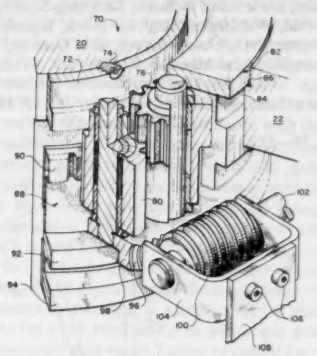
Edward Gregory Grohoski, Litchfield, Conn., assignor to The Hartford Special Machinery Company, Simsbury, Conn.

Filed Dec. 6, 1976, Ser. No. 747,483

Int. Cl.[2] B23B *29/24;* **F16H** *35/06, 35/08*

U.S. Cl. 74—813 C **20 Claims**

1. For use in a workpiece forming machine having a spindle rotatably mounted on a fixed frame with a circular die secured to the spindle for rotation therewith and a movable starter for successively feeding workpieces to the circular die at a forming station, a variable starter timing control comprising a differential having a first rotary input drive movable in response to the spindle, a second rotary input drive selectively operable to impart a supplementary input to the differential, and an output drive connected to the starter for operating it in selectively timed relation to rotation of the circular die in accor-



dance with the combined inputs of the first and second input drives.

4,088,046

METHOD OF PRODUCING FORMING TOOLS

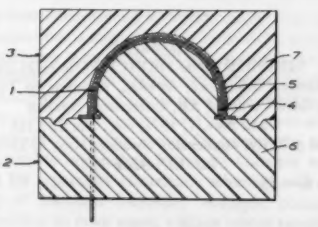
Lars Magnus Severinsson, Malmo, Sweden, assignor to H R B Tooling AB, Sweden

Filed Dec. 19, 1975, Ser. No. 642,376

Claims priority, application Sweden, Jun. 24, 1974, 74082439

Int. Cl.[2] B21K *5/20;* **B32B** *31/00*

U.S. Cl. 76—107 R **23 Claims**



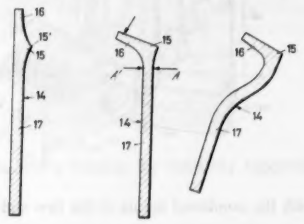
1. A method of producing a forming tool having a mold shell of metal, the shell having a surface shaped by a pattern body and having a support body bonded to the rear face of the mold shell, which comprises preparing a pattern of predetermined shape, applying a first layer of metal on each side of said pattern to conform to the contour of said pattern, applying a second layer of metal by thermal spraying, the two metals forming a bond which is substantially mechanically inseparable, the first metal being soft and of low melting point, the second metal having high wear resistance properties, thus forming a two-part mold shell consisting of a male part and a female part on said pattern, each part consisting of a mold shell of said two metals, bonding the rear face of the mold shell to a support body material and then separating the male and female part from said pattern.

4,088,047

METHOD OF PRODUCING CUTTING TEETH FOR A CHAIN SAW

Adolf Rätz, Korb; Adolf Wilhelm, Backnang-Steinbach; Gerhard Odenwald, Waiblingen; Siegfried Frank, Remshalden-Buoch, and Walter Stark, Unterweissach, all of Germany, assignors to Andreas Stihl Maschinenfabrik, Neustadt, Germany

Filed Jul. 15, 1976, Ser. No. 705,555
Claims priority, application Germany, Jul. 19, 1975, 2532404
Int. Cl.[2] B23D *63/00*
U.S. Cl. 76—112 12 Claims



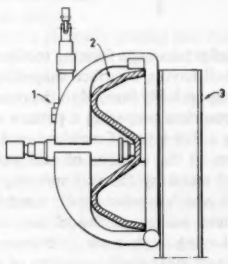
1. A method of making cutting teeth for a saw chain each of which has a base body and a tooth roof, and in which said base body is cranked along a substantially sharp edge relative to said tooth roof, said method including in combination the steps of: providing as starting material a flat band having two flat surfaces located opposite to each other with at least one of said flat surfaces having at least one ridge-shaped projection located closer to one longitudinal edge of said band than to the oppositely located longitudinal edge of said band and extending in the longitudinal direction of said band, cutting said band into sections transverse to the longitudinal axis of said band so that each section has an overall size just sufficient for the formation of a cutting tooth to be formed free of tears or cracks, the said at least one ridge section dividing the respective cut-off band section into a shorter end portion and a longer end portion, and essentially only once bending said shorter end portion uniformly in grain flow without overlapping longitudinally about the pertaining ridge portion so that the outer surface of said shorter end portion forms a desired angle with the adjacent portion of the pertaining longer end portion and represents the tooth roof.

4,088,048

METHOD AND DEVICE FOR HOLING

Hans Ölsson, Ostersund, Sweden, assignor to Hans Olssons Mekaniska Verkstad AB, Ostersund, Sweden

Filed Nov. 1, 1976, Ser. No. 737,181
Claims priority, application Sweden, Nov. 3, 1975, 7512281
Int. Cl.[2] B26F *1/34*
U.S. Cl. 83—55 5 Claims



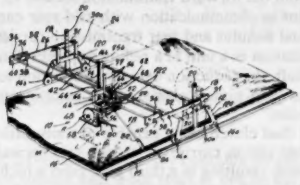
1. A method of holing an oblong member, such as a guard rail or the like, substantially directly in front of a hole in a second member, such as a pole or the like, including the steps of: positioning a punching device having a punch, and a first and a second pressure means for actuting the punch, on said oblong member; moving said punching device along the oblong member by roller means until the punch is located substantially directly in front of the hole in the second member; actuating said punch by said first pressure means to thereby cause said punch to abut the oblong member; and holding said oblong member by moving the punch by actuating the second pressure means.

4,088,049

MATERIAL CUTTING APPARATUS

John P. Benedict, 7026 Kildare, Cote St. Luc, Montreal, Quebec, Canada

Filed Nov. 10, 1975, Ser. No. 630,702
Int. Cl.[2] B26D *7/26, 5/10*
U.S. Cl. 83—240 14 Claims



1. A material cutting apparatus comprising:

a pair of spaced-apart arm structures adapted to be pivotally connected to an existing carriage unit which is movable mounted on a cutter board whereby the material cutting apparatus can be moved from one side of the carriage unit to the other side thereof, the carriage unit supporting a roll of material to be laid on the cutter board as the carriage unit is moved along the cutter board, the arm structures supporting rail means adapted to extend a width of the material being laid from the roll of material onto the cutter board, and at right angles to a length of the material being laid;

a bracket structure slidably mounted on the rail means, the bracket structure adapted to be advanced along the rail means across the width of the material being laid on the cutter board;

the bracket structure supporting a cutter, the cutter adapted to cut the material being laid onto the cutter board;

the material cutting apparatus, when mounted on the carriage unit, adapted to be moved along the cutter board so as to permit the cutting of material by means of the cutter at any location on the cutter board along the length of the material being laid, the bracket structure and the cutter when manually advanced along the rail means adapted to cut the material along a straight line perpendicular to the length of the material and increasing the rate at which material can be laid on the cutter board.

4,088,050

MOLDED PLASTIC TOY STRINGED INSTRUMENT

Mel Appel, Short Hills, N.J., assignor to Proll Molding Co., Inc., Newark, N.J.

Filed Sep. 27, 1976, Ser. No. 727,167
Int. Cl.[2] G10D *1/08*
U.S. Cl. 84—267 1 Claim

1. In a toy stringed musical instrument having a soundbox, a neck and a pegboard, the improvements comprising:

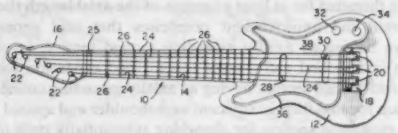
(a) said soundbox opening downwardly and including a planar top surface and integral continuous curved side walls wherein an integral barrier wall extends between the side walls of said neck at the junction of the neck and the

soundbox, said barrier preventing access to a paperboard bottom wall of the soundbox;

(b) a bridge with integral guide and teeth situated on the top surface of said soundbox;

(c) said neck having a planar top surface with integral spaced side walls and integral longitudinal ribs, which in conjunction with integral transverse braces at the junction of the neck with the pegboard and with the soundbox, strengthen the instrument and resist torsional twisting;

(d) said pegboard, with integral side walls, having a plurality of pegs therein;



(e) said soundbox, said bridge, said neck, said pegboard and all of said sidewalls being executed in plastic as a unitary casting;

(f) a plurality of strings secured in tension between the pegs and the bridge for producing musical sounds; and

(g) a paperboard bottom wall secured to the open side of the soundbox on the bottom edges of the side walls, on a central post integral with the soundbox and on a plurality of said integral braces to complete same.

4,088,051

MUSICAL INSTRUMENTS

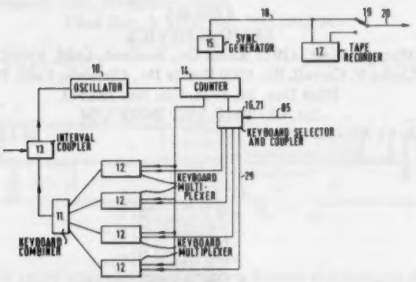
Leonard William Ellen, "Mapesbury", Sandy La., Northwood, Middlesex, England (HA6 3HA)

Filed May 13, 1976, Ser. No. 686,256

Claims priority, application United Kingdom, May 15, 1975, 20570/75

Int. Cl.[2] G10B *1/00*

U.S. Cl. 84—331 **11 Claims**



1. A pipe organ comprising a pipe sounding section having a rank of pipes for sounding musical notes, a note playing section having a plurality of playing keys allocated to individual notes and operable by a player of the organ, and a plurality of stops operable by the player of the organ for selecting desired correlations between keys played and pipes to be sounded, one of said stops selecting a given basic pitch relationship desired between the keyboard and the pipes, others of said stops selecting other pitch relationships desired between the keyboard and the pipes, said organ comprising time-division multiplex means for cyclically electrically sensing the operative conditions of the stops and keys and providing a multiplex signal representative of the operative condition of the organ at any time, means for transmitting the signal to the pipe sounding section of the organ, store means allocated to the individual stops, means for operating the store means from said signal to cause said store means to store sensed operative conditions of the stops, means for modifying the signal, said modifying means being means which are operable during each time-division multiplex stop that a key operative condition is being sensed and which modify the signal a number of times equal to the number of said pitch relationships whereby said modified signal successively represents the address of a pipe having said basic pitch relationship to the playing key being sensed, and the addresses of pipes having said other pitch relationships to the playing key being sensed, means for de-multiplexing the modified signal and means for controlling individual pipes in response to the signals from the de-multiplexing means, in accordance with the sensed operative conditions of the keys, there being gate means for each said desired pitch relationship, each said gate means having a plurality of inputs, there being means activating one said input in accordance with the playing key being sensed having been depressed, means activating another of said inputs from the store means allocated to a stop selecting and pitch relationship to which said gate means is allocated, means activating another of said inputs during the time period when the modifying means is effecting a modification of said signal appropriate to the pitch relationship to which said gate means is allocated, each said gate means having an output for enabling operation of said pipes by said pipe controlling means when all inputs of a given gate means are simultaneously activated.

4,088,052

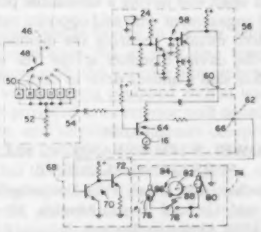
STRING INSTRUMENT TUNING APPARATUS

W. David Hedrick, P.O. Box 39, Campbellsville, Ky. 42718

Filed Nov. 2, 1976, Ser. No. 738,120

Int. Cl.[2] G10G *7/02*

U.S. Cl. 84—454 **10 Claims**



1. A string instrument tuning apparatus comprising a hand-held tuning apparatus, a musical string instrument, string tensioning pin receiving receptacle, said pin receiving receptacle rotatably journalled to said tuning apparatus, a motor, said motor for rotating said pin receiving receptacle, audible detection means for receiving tones produced by said musical string instrument, voltage generating means for selectively producing one of a plurality of standard frequency voltages, selector switch means for separately electrically selecting said one of said plurality of standard frequency voltages, comparator means for providing an error signal voltage whose amplitude is proportioned to the difference in frequency of said tones and said one of said plurality of standard frequency voltages, motor energizing means for energizing said motor from said error signal voltage, timing means for intermittently controlling the timed duration of energization of said motor.

4,088,053

CAVITY RIVET ASSEMBLY

Gerald Wayne Tyree, Sun Valley, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Division of Ser. No. 399,311, Sep. 21, 1973, abandoned. This application Feb. 26, 1975, Ser. No. 553,224

Int. Cl.[2] F16B *5/04, 19/04*

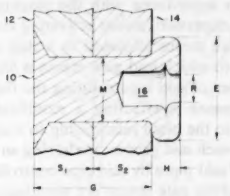
U.S. Cl. 85—37 **8 Claims**

1. A riveted assembly of load-bearing structural members comprising:

at least two rigid structural members in juxtaposition with each other having aligned holes therethrough;

a rivet having an enlarged head on one end and a shank extending through said holes with said enlarged head engaging a surface on one side of said structure and a free end of said shank on the opposite end protrudes from the aligned openings outward beyond an opposite outer surface of a bottom member of said structure adjacent said free end of said rivet,

the free end of the shank containing a cavity originating at its extremity and terminating at a position between the two surfaces of the bottom member and inwardly of



said opposite surface thereof, all shear planes of said structural members being positioned between the terminus of said cavity and said head;

the rivet being of a hardness relatively greater than that of the members; and

the rivet shank being deformed radially outward by an axially directed force applied against said end in the region of said cavity, the deformed portion defining an enlarged upset end having a substantial portion thereof in radial engagement with said opposite outer surface of the bottom member securing the members tightly together, the cavity diameter at the free end being no larger than said diameter prior to such deformation.

4,088,054

IMPACT DOWEL WITH EXPANDING SLEEVE AND SPREADING ELEMENT

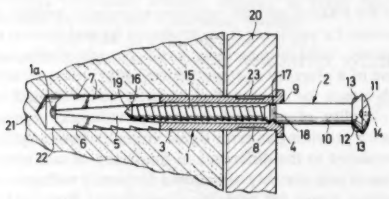
Wolfgang Lippacher, Breitbrunn; Paul Deutschenbaur, Unterpfaffenhofen, and Gerhard Teger, Munich, all of Germany, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed Feb. 15, 1977, Ser. No. 768,751

Claims priority, application Germany, Feb. 23, 1976, 2607338

Int. Cl.[2] F16B *13/04*

U.S. Cl. 85—84 **17 Claims**



1. Impact dowel for insertion into a bore hole in a receiving material comprising an axially elongated expanding sleeve to be inserted into the bore hole and an axially elongated spreading element insertable into said sleeve for expanding the sleeve laterally outwardly into engagement with the surface of the receiving material in the bore hole, said expanding sleeve and spreading element each having a first forward end and a second rearward end with the first end being inserted first into the prepared bore hole for the dowel, said expansion sleeve having an expansion section extending from the first end toward the second end thereof for expansion laterally outwardly into engagement with the surface in the bore hole and said sleeve having axially extending slots in said expansion section, said expanding sleeve having a bore therein extending at least from the second end into said expansion section, said bore having a first diameter at the second end of said sleeve and at least a second diameter in said expansion section which is smaller than said first diameter, said expanding sleeve having a shoulder at the second end thereof extending radially outwardly from the outer surface of said sleeve, said spreading element having an axially elongated shank extending from the first end to the second end thereof and a head located at the second end of said shank extending laterally outwardly from the shank, said shank being threaded for at least a portion of the axial length thereof, wherein the improvement comprises that said expanding sleeve having an axially extending second section extending from said second end thereof toward said expansion section, and said second section having an axially extending connecting section located therein adjacent said shoulder and spaced from said expansion section for absorbing substantially only tensile forces, said connecting section including means for being deformed in the axial direction of said expanding sleeve for reducing the axial length of said connecting section upon impact driving of said spreading element into said bore, and said expanding sleeve having at least two flexible supporting sections intermediate the first and second ends thereof and disposed in surface contact with the shank of said spreading element and disposed at axially spaced locations within the bore in said sleeve for limiting the penetration of said spreading element into said bore in said sleeve.

4,088,055

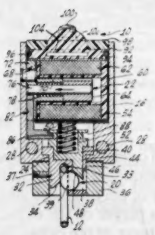
ARMING DEVICE

William F. West, 12077 Kalua Dr., Sunland, Calif. 91040, and Curtis V. Correll, Sr., 1900 Bonita Dr., Glendale, Calif. 91208

Filed Dec. 29, 1976, Ser. No. 755,541

Int. Cl.[2] F41F *5/02*; B64D *1/04*

U.S. Cl. 89—1.5 D **18 Claims**



2. A multi-directional arming device for selectively allowing a munition to be discharged in a safe condition or an armed condition comprising:

a housing;

detent means rotatably mounted in said housing for releasably holding an arming wire, whereby said detent means can assume a position aligned with the direction of pull of said arming wire; and

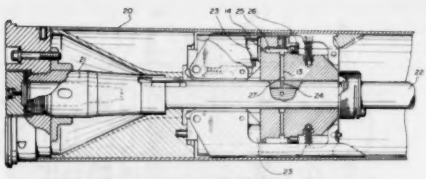
retention means for selectively preventing operation of said detent means to prevent release of said arming wire, said wire retention means including an electrically energizable solenoid non-rotatably mounted within said housing.

4,088,056

GAS INITIATED CARTRIDGES

Jean Guy Dallaire, Loretteville, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of Defence, Canada

Filed Nov. 12, 1976, Ser. No. 741,487
Claims priority, application Canada, Jan. 20, 1976, 243833
Int. Cl.[2] F41F *3/02, 15/00*
U.S. Cl. 89—1.7 1 Claim



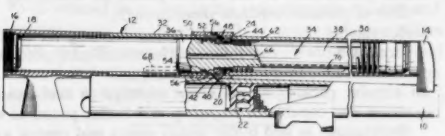
1. A sub-calibre back-blast simulation cartridge for a recoiless rifle, comprising a cartridge casing of the calibre of the recoiless rifle in which is fitted a first chamber for receiving a primary cartridge containing a projectile, said chamber being connected to a sub-calibre barrel, a second chamber for receiving a secondary blank cartridge, a passage communicating between said barrel and said secondary chamber, said second chamber having a port therein connected to said passage, said port being positioned to be adjacent the primer of said secondary cartridge when said blank secondary cartridge is in said secondary chamber, whereby gases from said barrel caused by discharge of said primary cartridge directly impinge on and cause deformation of the primer of said secondary cartridge to initiate discharge thereof providing a back-blast simulation.

4,088,057

RECOIL REDUCING AND PISTON SHOCK ABSORBING MECHANISM

Paul Nasypany, Herkimer, N.Y., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Dec. 3, 1976, Ser. No. 747,204
Int. Cl.[2] F41F *3/02*
U.S. Cl. 89—1.701 6 Claims



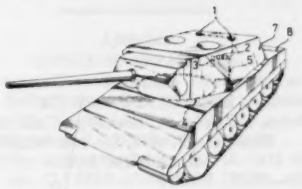
1. A recoil attenuation system for a firearm that reduces the recoil force felt by the shooter, said system comprising a barrel, a gas cylinder attached to said barrel, said gas cylinder having front and rear end walls, a stationary seal ring mounted in said cylinder intermediate its ends thereof to define a forward cylinder section and a rear cylinder section, a movable inertia means having a piston portion positioned for sliding movement in the rear cylinder section and an elongated piston rod portion connected to said piston portion and normally extending through said seal ring into said forward cylinder section, said piston rod portion having at least a portion thereof capable of being slidably moved into said rear cylinder section, means in the forward cylinder section for biasing said inertia means forwardly, a gas chamber in said cylinder defined at its forward end by said seal ring and at its rear by said inertia piston portion, gas port means leading from the barrel to said cylinder gas chamber for bleeding thereinto a portion of the gases produced by a cartridge fired in said barrel whereupon said inertia means is driven sharply to the rear opposite to the direction of travel of a fired cartridge projectile, said inertia means being slowed down in the rear cylinder section by the trapping and compressing of air by the inertia piston portion as it moves toward the rear end wall of the gas cylinder, relief port means in the rear cylinder section to allow the gas pressure to drop rapidly after the inertia piston portion passes the relief port means, and metering means to permit escape of the trapped air in the rear cylinder section to decrease the velocity of the inertia means.

4,088,058

SYSTEM FOR THE TEMPORARY SEALING OF THE INTERIOR OF ARMORED VEHICLES, ESPECIALLY TANKS, AGAINST THE PENETRATION OF LIQUID OR GASEOUS SUBSTANCES

Karl-Heinz Flemming, Kassel, and Peter Grünewald, Fuldabruck, both of Germany, assignors to Wegmann & Co., Kassel, Germany

Filed Nov. 10, 1976, Ser. No. 740,629
Claims priority, application Germany, Nov. 14, 1975, 2551086
Int. Cl.[2] F41H *7/02*
U.S. Cl. 89—36 K 8 Claims



1. An armored vehicle having an interior, said interior being in fluid communication via at least one temporarily-to-be-closed aperature with the exterior atmosphere around said vehicle, said vehicle being equipped with at least one ventilation aperature provided in an exterior wall defining the interior of said vehicle, said ventilation aperture comprising a ventilation valve in said aperture responsive to compressed air, said valve connected to a central operating system, said ventilation aperture having a protective device disposed thereon on the exterior thereof, said protective device being a flat guard disposed over the said ventilation aperture to leave at least one lateral passage on which said ventilation valve is disposed, said ventilation valve comprising a valve cone disposed between said flat guard and said ventilation aperture and a valve seat disposed on the margin of said ventilation aperture, said flat guard has a central, cup-like capacity, closable from without by a bolted-on cover plate, and in which a compressed air piston is guided which in turn is connected to said valve cone via a connecting rod disposed through the bottom of a cavity and whose working face is connected via a diaphragm to the outer edge of said cup, the radial size of said diaphragm being adapted to the given stroke of the piston and the space between the diaphragm and said cover plate being fillable with compressed air, and a compression spring disposed between said piston and the bottom of said cavity.

4,088,059

METHOD AND APPARATUS FOR CONTROLLING AND UTILIZING RECOIL

Paul F. Hayner, Gilford, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

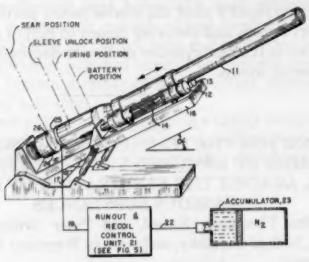
Filed Feb. 4, 1977, Ser. No. 765,706
Int. Cl.[2] F41F *19/14*
U.S. Cl. 89—43 A 38 Claims

11. Apparatus for controlling the runout of a gun barrel assembly equipped with a hydraulic recoil piston and cylinder comprising:

an accumulator which provides fluid under pressure;

means for connecting said accumulator to said recoil cylinder; and,

means for regulating the fluid flow from said accumulator responsive to the fluid pressure between said accumulator



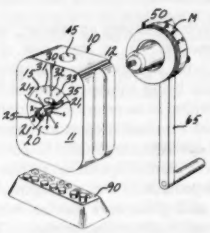
and said recoil cylinder so as to obtain a constant runout velocity.

4,088,060

KEY CUTTING DEVICE

Tom R. Johns, 510 Cedar St., San Diego, Calif. 92101

Filed Feb. 17, 1977, Ser. No. 769,315
Int. Cl.[2] B23C *3/35*
U.S. Cl. 90—13.05 **5 Claims**



1. Apparatus for cutting a cylindrical key blank according to a predetermined sequence of peripheral cuts comprising;

a support assembly including a cutter bore extending between two lateral sides thereof,

a splined key mount including a planar mounting portion having a splined shaft projecting therefrom and an elongate opening therein at a predetermined space from said shaft, said splined shaft having a plurality of splines disposed at predetermined peripheral intervals, said splined key mount being supported on one side of said support assembly with its elongate opening being in alignment with the axis of the cutter bore,

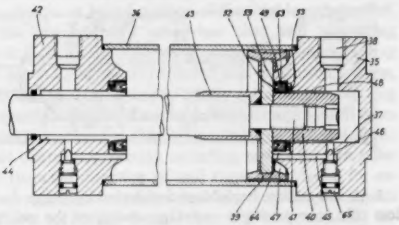
a cutter assembly including a cylindrical barrel having a central bore, one portion of said cylindrical barrel being slidably received in the cutter bore of said support assembly, a rotary cutter being mounted in the central bore of said cylindrical barrel and extending through the elongate opening of said spined key mount, a depth gage being in threaded engagement on the other end of said cylindrical barrel for abutting the other of said lateral sides of the support assembly thereby limiting the axial advancement of the barrel relative to the support assembly, and detent means associated with said barrel and said depth gage for selectively threadingly adjusting the gage on said barrel to control the depth of each of the peripheral cuts made by the cutter in the key blank.

4,088,061

PISTON/CYLINDER ASSEMBLIES

Kurt Stoll, Lenzhalde, Esslingen a. N., and Gerhard Hihn, Schurwaldstr. 7, Berkheim, both of Germany

Continuation of Ser. No. 516,587, Oct. 21, 1974, abandoned.
This application Oct. 4, 1976, Ser. No. 729,425
Claims priority, application Germany, Nov. 7, 1973, 2355593
Int. Cl.[2] F15B *15/22*
U.S. Cl. 91—26 **4 Claims**



1. A piston/cylinder assembly which provides for damping of the piston movement at the end of power strokes which comprises

a hollow cylinder;

a main piston positioned within said hollow cylinder for reciprocating movement therein;

a cylinder cover closing off one of the ends of said hollow cylinder, said cylinder cover having a central axial bore therein;

a buffer piston connected to said main piston on the side thereof facing said cylinder cover, said buffer piston being of appropriate dimensions to fit within said central axial bore of said cylinder cover;

a first means in said cylinder cover for conveying pressure medium into or out of said central axis bore from a point outside of said hollow cylinder;

a second means in said cylinder cover for conveying pressure medium between a pressure chamber, formed between said main piston and said cylinder cover, and said central axial bore;

means positionable in said second means for restricting the flow of pressure medium therethrough;

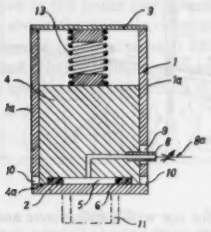
said cylinder cover including means forming an annular recess at a corner thereof which faces said main piston and which faces said central axial bore; and

an annular packing ring fixedly mounted in said annular recess and capable of engaging said buffer piston to seal thereagainst as said buffer piston enters said central axial bore of said cylinder cover during a power stroking movement of said main piston, the means forming said annular recess and said annular packing ring together providing a bypass between said pressure chamber and said central axial bore, said packing ring in cross-section comprising a double lip portion of generally rectangular configuration, a first side having an indentation therein forming an upper lip and a lower lip, said lower lip angling away from said upper lip and forming a sealing lip which is engagable with said buffer piston as said buffer piston enters said central axial bore; an inner portion extending away from said double lip portion and generally parallel to an axis through said sealing lip; and a non-return lip connected to said inner portion, said non-return lip extending generally parallel to, but away from, a second side of said double lip portion opposite to the first side containing said indentation, and which is positionable to prevent pressure medium bypass and pressure medium discharge from said pressure chamber through said bypass during movement of said main piston towards said cylinder cover and to allow bypass of pressure medium from said central axial bore to said pressure chamber during movement of said main piston away from said cylinder cover.

4,088,062
FLUID PRESSURE OPERATED IMPACT MECHANISM

Göran Alfred Nilsson, 820 22 Sandarne; Kjell Edström, Asbacksgatan 45, 82600 Soderhamn, and Henry Wiklund, Backvagen 1, 820 10 Arbra, all of Sweden

Filed Apr. 2, 1976, Ser. No. 673,308
Claims priority, application Sweden, Apr. 7, 1975, 7503970
Int. Cl.[2] F01L *21/02*
U.S. Cl. 91—50 10 Claims



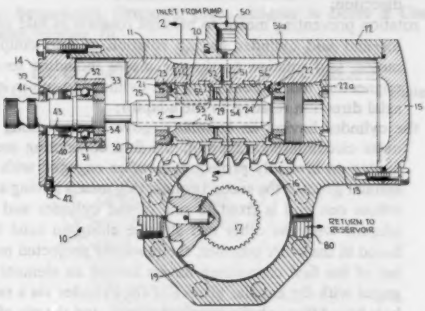
1. A fluid pressure operated impact mechanism comprising:
a. a plunger member and a stop member mounted to move towards and away from one another along an aligned axis in face-to-face relationship to deliver a succession of blows to a percussion tool or the like connected to one of said members;
b. annular flange means provided on one of said members effective to form a pressure chamber in an interface region between said members during reciprocating movement thereof;
c. means for supplying a pressure medium to said pressure chamber to exert a separating force between said members;
d. elastic deformable means arranged in said pressure chamber to be compressed axially between said members and pressed radially against said flange means by the force of the pressure medium during the movement of said members toward one another to seal said pressure chamber until the pressure therein attains a force effective to cause said members to separate and to restore said elastic means to its relaxed form during the separating movement; and
e. venting means for automatically venting pressure medium from said pressure chamber during that portion of said toward and away movement when said pressure chamber becomes unsealed by said elastic means.

4,088,063
POWER STEERING GEAR WITH SHORT PISTON AND FLUID BEARINGS

Richard H. Sheppard, 101 Philadelphia St., Hanover, Pa. 17331

Filed Oct. 29, 1976, Ser. No. 737,008
Int. Cl.[2] F15B *9/10;* F01B *9/00, 31/10*
U.S. Cl. 91—378 28 Claims

1. An integral power steering gear having a reciprocating power piston in a cylinder, a valve within the piston to selectively distribute pressurized fluid to a first and second end of the piston within the cylinder for steering action, a steering input shaft operatively engaging the valve at least adjacent said first end of said piston, an output means in engagement with said piston, the improvement comprising a bearing and bearing cap having an inwardly projecting annular portion supporting said input shaft adjacent the first end of said piston, retaining means for said bearing, said annular portion extending a distance substantially equal to said bearing and said retainer means, the valve within the piston being substantially centered in the piston opposite said output means with retaining means adjacent its ends, and a recess adjacent the first end of said piston for mating with the annular projecting portion of the bearing cap whereby

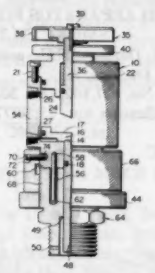


the length of the power steering gear with the valve within the piston is effectively reduced.

4,088,064
CONTROL APPARATUS

Shiro Tsunemoto, Edosaki; Teruki Mizuguchi, and Eiichi Hirayama, both of Azuma, all of Japan, assignors to Fuji Plastic Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1975, Ser. No. 565,546
Claims priority, application Japan, Apr. 10, 1974, 49-40475
Int. Cl.[2] F01B *31/14;* F15B *15/24*
U.S. Cl. 92—13.6 2 Claims



1. An improved control apparatus, comprising:
a cylinder having one end closed to form a chamber and provided with a pair of apertures apart from each other in the axial direction of the cylinder, a control fluid being introduced into and discharged from the chamber through said apertures;
a piston having a head movable within the chamber in its axial direction between the pair of apertures, and a rod integral with the head, said rod extending outward through the bottom of the cylinder;
control means variably extending inside the chamber through the closed one end, the sliding motion of the piston head being defined by the control means and the bottom of the cylinder; an adaptor for fixedly mounting the control apparatus to a member to be controlled; said adaptor having an externally threaded part formed at one end thereof;
coupling means for connecting the cylinder to the adaptor, said coupling means being rotated to move the cylinder in its axial direction without rotating the cylinder and having an internally threaded annular part formed at one end thereof and meshing annularly around the externally threaded part of the adaptor;
the coupling means having first connecting means provided round the outer circumference of the cylinder and being

capable to abut the cylinder, the rotation of the first connecting means serving to move the cylinder in its axial direction;

rotation preventing means to prevent rotation of said adaptor and said cylinder having rotation of said coupling means, said rotation preventing means including second connecting means permitting the cylinder to move in its axial direction relative to the adaptor;

the cylinder having an annular groove formed along the outer circumference thereof, the first connecting means having an inwardly projected member engaged with the annular groove; the second connecting means having a pin whose one end is fixed to one of the cylinder and the adaptor with the other end slidable along an axial hole bored in the other member; the inwardly projected member of the first connecting means having an element engaged with the annular groove of the cylinder via a radial hole bored through the coupling means, and the pin of the second connecting means being fixed to one of the cylinder and the adaptor by forcedly inserting the pin into an axial hole provided therein.

4,088,065

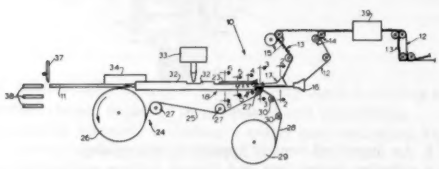
METHOD AND APPARATUS FOR MAKING TOBACCO SMOKE FILTER

Floyd Van Hall, Durham, N.C., assignor to Liggett & Myers Incorporated, Durham, N.C.

Division of Ser. No. 627,168, Oct. 30, 1975, Pat. No. 4,034,765. This application Apr. 25, 1977, Ser. No. 790,649

Int. Cl.² A24C *5/50*

U.S. Cl. 93—1 C **8 Claims**



1. In a method of making a filter rod for cigarette filter tips, the steps of

generating a first stream composed of fibrous filter material;

generating a second stream composed of fibrous filter material;

maintaining the first stream of fibrous filter material under a longitudinal tension greater than said second stream during the continued travel of both streams to form a filter rod;

placing said streams in juxtaposition during travel while simultaneously enveloping said second stream of fibrous material circumferentially about said first stream of fibrous material;

generating a third stream composed of paper;

circumferentially enveloping said third stream about said juxtaposed first and second streams during continued travel of said first, second and third streams to form a filter rod; and

moving said rod to continue movement of said three streams while constricting said second stream about said first stream for continued travel therewith.

4,088,066

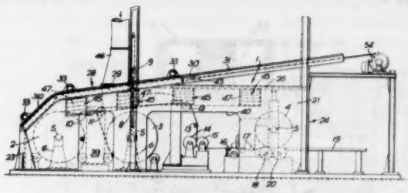
DUST EXTRACTION APPARATUS FOR USE WITH PAPER AND LIKE MACHINERY

Victor Bailey, Alverstone, England, assignor to Bowater-Scott Corporation Limited, London, England

Filed Aug. 20, 1976, Ser. No. 716,219

Int. Cl.² F23J *11/00*

U.S. Cl. 98—115 R **6 Claims**



1. Apparatus for use with paper, tissue and like fibrous sheet material rewind machinery comprising a booth disposable substantially around rewind machinery to form an enclosed compartment therearound, said booth having side walls extending up from a floor on which rewind machinery is disposed, an intake end wall extending up from the floor, a take-off end opening for withdrawal of rewind bars, a fixed cover over at least part of said take-off end, an uncovered top portion at said take-off end through which wound reels may be introduced and withdrawn, vent openings in said booth connected to extraction conduits to create reduced pressure thereat, a moveable cover portion moveable between an inoperative position clear of said intake opening, and an operative position in which it closes said intake opening, means to move said cover between said positions, and means to create pressure difference between the inside and outside of the booth to induce flow of air from the atmosphere through said vent openings to minimise egress of dust from said booth without substantially disturbing said sheet material as it is rewound in said booth.

4,088,067

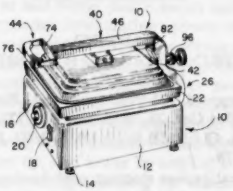
COOKING APPLIANCE

Johannes W. Kaebitzsch, Crystal Lake, and John L. Tuegel, Island Lake, both of Ill., assignors to McGraw-Edison Company, Elgin, Ill.

Filed Jun. 11, 1976, Ser. No. 695,093

Int. Cl.² A47J *37/06*

U.S. Cl. 99—379 **2 Claims**



1. A sandwich grill comprising the combination of a housing having a bracket at the rear side thereof, a lower platen supported on the housing forwardly of the bracket, an L-shaped arm, a pivotal connection between the bracket and the arm near one end of the arm to allow the opposite end of the arm to extend forwardly over the lower platen, a handle on the opposite end of the arm, an upper platen, means pivotally supporting the upper platen to the arm intermediate the handle and the pivotal connection, whereby pivotal movement of the arm moves the upper platen between an open position well spaced relative to the lower platen and a closed position closely adjacent and opposing the lower platen, adjustable

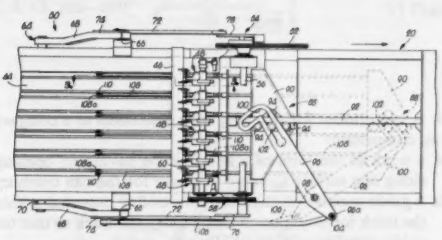
counterbalance means extended between the housing and the one end of the arm spaced from the pivotal connection for resiliently biasing the upper platen toward the open position, means to heat the upper and lower platens, an upwardly extending stop rigid with said bracket and spaced above and forwardly of the pivotal connection and rearwardly of the lower platen, adjustable projection means secured to the arm and disposed to abut the stop on a rearward surface thereof to mechanically limit the proximity in the closed position of the upper platen relative to the lower platen, and means exposed rearwardly of the above the pivotal connection in the closed positions of the upper platen to adjust and lock the position of the projection means relative to the arm operable to adjust as desired the closed spacing of the upper platen from the lower platen.

4,088,068

SLACKENING MECHANISM FOR BALE TIER

Allen Andrew White, Peabody; George Yatcilla, and Garold Lee Fleming, both of Newton, all of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Aug. 25, 1976, Ser. No. 717,521
Int. Cl.[2] B65B *13/02*
U.S. Cl. 100—3 **4 Claims**



1. In a baling method where a bale is forced through a baling chamber and progressively increased in size by the intermittent packing of additional material against the trailing end of the bale, the steps of:

presenting one end of a binding strand to a stationary holder on the top of the chamber in such a manner that the strand extends across the chamber for subsequent capture within the interface between a bale under formation and a preceding bale;

drawing a slack loop in the strand equal to the length of the bale to be formed,

said loop having a bight and a pair of legs interconnected by the bight, one of said legs leading from said bight to said holder and the other of said legs leading from said bight to a source of strand supply;

placing at least said other leg of the loop on the top surface of the preceding bale with said other leg extending parallel to the path of travel of the preceding bale;

carrying said other leg in the direction of bale travel on said top surface during bale formation so as to progressively deplete the loop, lengthen said one leg along the top surface of the bale being formed, and shorten said other leg;

progressively obtaining an additional length of strand from said source of supply during said carrying step and extending the same along the bottom surface of the forming bale so as to preclude movement of the strand through said interface during bale formation; and

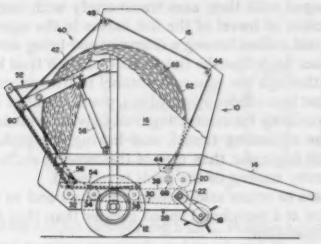
presenting the opposite end of the strand to the holder upon depletion of said loop for joining said ends together.

4,088,069

ELASTIC BALE-FORMING CONVEYOR FOR CYLINDRICAL BALES

Gust Soteropulos, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jun. 8, 1976, Ser. No. 693,771
Int. Cl.[2] A01D *39/00*; B65H *17/06*; B30B *5/06*
U.S. Cl. 100—88 **4 Claims**



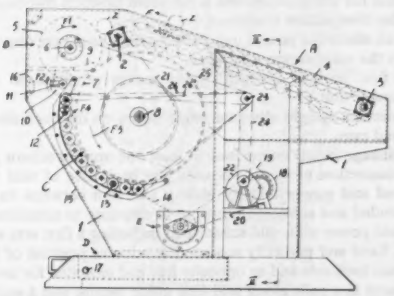
1. In a mobile machine for forming large cylindrical bales of crop material including means for delivering a mat of crop material to a baling zone, the combination therewith of an improved bale-forming endless conveyor trained around a plurality of rollers and having a yieldable moving bale-engaging run spanning the baling zone and engageable with the mat or crop material for rolling the crop material into a generally cylindrical bale, said bale-engaging run substantially engaging the bale periphery and yielding to accommodate a growing bale during its formation, said yielding requiring that the effective length of the conveyor when engaging a fully formed bale be at least ten percent greater than the effective length at the inception of the formation of the bale and said conveyor comprising at least one endless elastic belt stretchable in length to provide said yielding.

4,088,070

APPARATUS FOR EXTRACTING JUICE FROM CITRUS FRUITS

Nevio Montagroni, 4, Via Organi, Forli, Italy (47100), and Cesare Roda, 6, Via Ugo Bassi, Cesena, Italy (47023)

Filed Nov. 10, 1976, Ser. No. 740,524
Claims priority, application Italy, Nov. 11, 1975, 12875 A/75
Int. Cl.[2] B30B *9/20, 3/04*
U.S. Cl. 100—121 **7 Claims**



1. Apparatus for extracting juice from citrus fruits of the type in which previously cut fruit halves, are caused to travel through a squeezing tunnel defined by two opposed converging surfaces, including means for orienting said fruit halves with their cut flat surfaces in a predetermined direction, said squeezing tunnel comprising:

(a) a moving endless surface, consisting of a portion of an

endless conveyor moving in a direction from the inlet to the outlet of the squeezing tunnel and arranged to be in continuing contact with the hemispherical peel side of the fruit half, said moving endless surface being constructed as a friction surface capable of frictionally engaging the peel of the fruit half;

(b) a fixed surface arranged to be in continuing contact with the cut flat surface of the fruit half, said fixed surface consisting of a plurality of consecutive rotating rollers arranged with their axes transversely with respect to the direction of travel of the fuit halves in the squeezing tunnel, said rollers having a diameter and being arranged in a manner such that the flat surface of each fruit half travelling through the squeezing tunnel is always contacted by at least two consecutive rollers, the said rollers rotating so as to convey the contacting fruit halves towards the outlet of the squeezing tunnel, and having a peripheral speed which is greater than that of the moving endless surface, whereby curling of the peels is reduced;

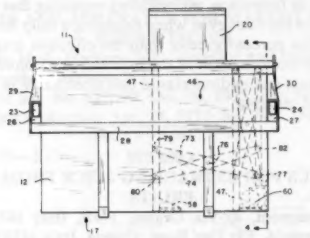
(c) means to rotate said endless conveyor and to rotate said rollers at a peripheral speed greater than that of the endless conveyor.

4,088,071

REFUSE COMPACTOR

Harry R. Cruse, Carmichael, and Richard I. Copenhagen, Orinda, both of Calif., assignors to Pacific Waste Equipment Corporation, Emeryville, Calif., by said Richard I. Copenhagen

Filed Jun. 17, 1976, Ser. No. 697,135
Int. Cl.[2] B30B *1/18*
U.S. Cl. 100—245 **8 Claims**



1. A refuse compactor comprising,

(a) a compaction container,

(b) a mechanically actuated ram comprising an upright plate mounted for sliding movement between an extended position for compaction and a retracted position disposed in the compaction container,

(c) an electrical power unit for actuating said ram disposed in the compaction container,

(d) first upright elongate guide means proximal to said power unit,

(e) second upright elongate guide means on the back side of said ram,

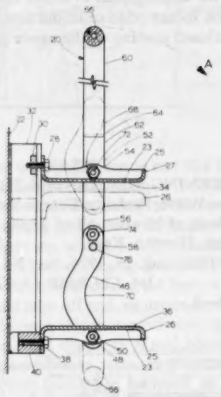
(f) linkage means comprising at least one upright scissor pair connection mounted between the back side of said ram and said power unit for sliding said ram between its extended and retracted positions in response to actuation of said power unit, said scissor pair including a first arm with a fixed end pivotally mounted at a lower position of said ram back side and an opposite free end mounted for movement in a path along said first guide means, and a second arm with a fixed end adjacent and below said first arm free end in first guide path, the opposite free end of said second arm being mounted for movement in a path along said second guide means above the fixed end of said first arm, said power unit being interconnected with said first arm free end to move it in said first guide means path to actuate movement of said ram between its extended and retracted positions, the ends of said scissor arm pair adjacent the back side of said ram being located in the lower portion thereof at a maximum ram extension to support the maximum compaction load.

4,088,072

CAN CRUSHER FOR REDUCING CANS OR SIMILAR CONTAINERS TO A COMPACT FORM

George F. Wittmeier, 15651 SE. 8th, Bellevue, Wash. 98008

Filed Apr. 23, 1976, Ser. No. 679,577
Int. Cl.[2] B30B *1/02*
U.S. Cl. 100—283 **10 Claims**



1. A can crusher for reducing such containers to a compact form, comprising:

a. a track in the form of a hollow tube having an opening along one surface to serve as a base for the can crusher;

b. a guide member in the form of a trolley mounted within the track for low friction travel along the track so that the guide member will travel along the track;

c. a first jaw positioned exterior to the track and rigidly and transversely attached to the track;

d. a second jaw positioned exterior to the track and attached to the guide member in juxtaposition and opposed to the first jaw which may be variably spaced from the first;

e. a first lever arm pivotally attached at a first end to the first jaw;

f. a second lever arm pivotally attached at a midpoint to the second jaw and pivotally attached at a first end to the second end of the first lever; and

g. means for actuating the can crusher attached to the second end of the second lever so that a can may be inserted between the jaws when the second end of the second lever arm is in a position away from the first jaw and the can is crushed between the jaws when the second end of the second lever arm is swung through an arc toward the first jaw causing the jaws to converge.

4,088,073

PROCESS FOR PREPARING INK RELEASING STENCIL

Richard G. Crystal, Dallas, Tex., and Frank J. Walton, Los Altos, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 27, 1973, Ser. No. 428,962
Int. Cl.[2] B41C *1/14*; B41N *1/24*
U.S. Cl. 101—128.4 **11 Claims**

1. A method for preparing a stencil comprising:

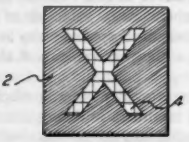
(a) providing a suitable screen,

(b) coating said screen with a curable silicone containing a curing catalyst,

(c) depositing a particulate image pattern on the coated screen, said pattern comprising a material which selec-

tively inactivates said curing catalyst below said image pattern,

(d) curing the silicone in the nonimage areas to an elastomeric ink releasable condition, and



(e) removing the particles and the uncured silicone below said pattern.

4,088,074

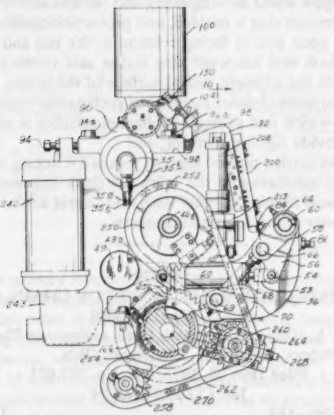
APPARATUS FOR INKING PRINTING PLATES

Harold P. Dahlgren, 726 Regal Row, Dallas, Tex. 75247, and Harvey W. Dahlgren, P.O. Box 8234, Mobile, Ala. 36608

Continuation of Ser. No. 526,486, Nov. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 251,740, May 9, 1972, abandoned. This application Feb. 2, 1976, Ser. No. 654,321

Int. Cl.[2] B41L *27/08, 27/16, 23/04*

U.S. Cl. 101—350 **17 Claims**



1. Apparatus to meter liquid comprising: a frame; first and second rollers; means rotatably securing said first and second rollers to said frame such that a metering nip is formed between adjacent surfaces of said first and second rollers; first and second pairs of end seal elements, each of said second pair of end seal elements having a convex peripheral surface having a radius of curvature substantially equal to the radius of curvature of said second roller; means urging said first pair of end seal elements into non-rotating, sealing relation with opposite ends of said first roller; means urging said second pair of end seal elements into non-rotating sealing relation with opposite ends of said second roller, said arcuate peripheral surfaces extending outwardly of the ends of said first end seal elements; a pair of end dams each having a flat sealing surface and a concave sealing surface; means urging said flat sealing surfaces into sealing relation with ends of said first pair of end seal elements; means urging said concave sealing surfaces into sealing relation with said convex peripheral surfaces on said second pair of end seal elements; and means to rotate at least one of said first and second rollers.

4,088,075

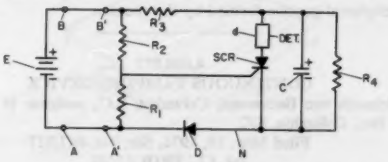
FIRING CIRCUIT

Robert A. Hayman, Williamsville, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 6, 1976, Ser. No. 702,652

Int. Cl.[2] F42C *11/00, 15/14*

U.S. Cl. 102—70.2 R **8 Claims**



1. In a firing circuit comprising a D.C. voltage source having negative and positive terminals and an electrical network; said network comprising:

first and second terminals adapted to be connected to said negative and positive terminals, respectively;

a diode, an SCR, an electrical detonator and a resistor connected in series with each other and in parallel with said first and second terminals, respectively, with the anode of said diode connected to the cathode of said SCR, the gate of said SCR being connected to the cathode of said diode; and

a firing capacitor and another resistor each connected in parallel across the combination of said SCR and said detonator.

4,088,076

SPINNING PROJECTILE EQUIPPED WITH AN ELECTROMAGNETIC IGNITION CURRENT GENERATOR

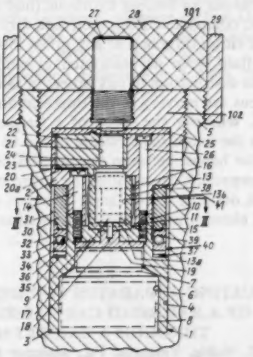
Panayotis Karayannis, Zurich, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zurich, Switzerland

Filed Mar. 8, 1976, Ser. No. 664,923

Claims priority, application Switzerland, Mar. 14, 1975, 3243/75

Int. Cl.[2] F42B *13/02;* **F42C** *11/04, 15/04, 15/40*

U.S. Cl. 102—70.2 G **8 Claims**



1. A spinning projectile for firing from a weapon barrel and of the type equipped with an electromagnetic ignition current generator, comprising a rotatable fuze housing, an inner generator component fixedly arranged at said rotatable fuze housing for rotation therewith while the spinning projectile is in the barrel of the weapon firing of such spinning projectile, an

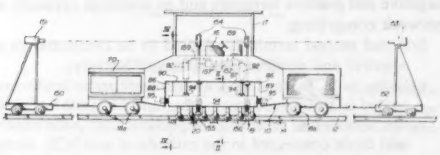
armature coil provided for the inner generator component, an outer generator component provided with a field magnet, said fuze housing having a recess defining a peripheral groove, bearing means incorporating two bearing bodies housed in the recess of the fuze housing, one of the bearing bodies being arranged at the fuze housing and the other bearing body forming part of the outer generator component, both of the bearing bodies having a substantially ring-shaped configuration and further having essentially the diameter of said field magnet and form a bearing means for centering the field magnet, and the fuze housing having a wall portion bounding at its inside the peripheral groove formed by the recess.

4,088,077

CONTINUOUS TAMPING DEVICE

Helmuth von Beckmann, Columbia, S.C., assignor to Canron, Inc., Columbia, S.C.

Filed Mar. 15, 1976, Ser. No. 667,017
Int. Cl.² E01B *27/20*
U.S. Cl. 104—12 **12 Claims**



1. A railroad track tamping machine for consolidating and compacting ballast underneath and between railroad ties comprising at least one set of tamping elements, the elements in said set being spaced in the direction of the length of the track a distance unequal to the spacing of the ties, means for mounting said tamping elements on said machine and for guiding them in a path such that, in operation, they move over the upper surface of the ties and over the upper surface of the ballast between said ties in pressure contact with the ballast and the ties, and means for vibrating said tamping elements, during operation thereof, to consolidate and compact said ballast, said vibrating means comprising a hydraulic system including means to create a rapid fluctuation of hydraulic pressure therein whereby said tamping elements are vibrated, said hydraulic system also comprising a series of cylinders, pistons mounted in said cylinders, piston rods extending downwardly from said pistons and each having a said tamping element mounted on the lower end thereof, and pressure equalizing conduit means for feeding hydraulic fluid to said cylinders, the hydraulic connection being such that, forced movement of one piston in either direction at any given moment will feed pressurized fluid from its associated cylinder into said conduit means for distribution to any others of said cylinders in which the pistons are moving in the opposite direction at that given moment, whereby the force of a tamping element on a tie prevents the undesirable raising of the tie due to the compaction of the ballast between the ties and hence provides a uniform compaction throughout the entire ballast structure, and the work done by the different cylinders and pistons for each tamping element is automatically equalized.

4,088,078

LUBRICATING APPARATUS FOR REDUCING SQUEAL NOISE OF A RAILROAD CAR WHEEL WHEN PASSING THROUGH A CAR RETARDER

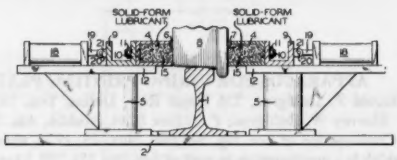
Peter M. Noble, Valencia, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Jun. 4, 1976, Ser. No. 693,269
Int. Cl.² B61B *1/00*
U.S. Cl. 104—26 A **3 Claims**

1. Lubricating apparatus for reducing squeal noise of railroad car wheels passing through a railroad car retarder, said retarder mounted along a track rail over which move said car wheels which have respective annular parallel lateral surfaces on opposite sides adjacent the periphery thereof and which surfaces are engaged on both sides by the parallel brake shoes of said retarder, comprising,

a. elongated members and support means therefor mounted along said rail ahead of said retarder for positioning said elongated members one on each side of and parallel to the rail at a predetermined spaced-away relation thereto for accomodating rolling movement of the wheel therebetween,

b. a lubricant slug complementarily disposed into each of said elongated members in facing relationship to and at such height above said rail to make rubbing contact with the annular lateral surfaces of each passing wheel only for applying thereto a coating of said lubricant to reduce squeal when retarder brake shoes subsequently engage said wheel surfaces,



c. said elongated members each comprising,

1. a protective channel member of rectangular cross-section having a length equal to the circumference of the largest wheel moving along said rail and into which said lubricant slug is molded, said protective channel having an open side in facing relation to the rail and through which said lubricant slug makes said rubbing contact with the adjacent lateral surface of the wheel, and

2. a support channel member of rectangular cross-section to which said protective channel member is secured to provide rigidity therefor, and

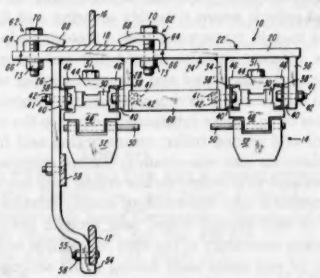
d. means carried on said support means for urging said elongated members and the lubricant slugs disposed therein into said rubbing contact with said lateral surfaces with a predetermined degree of pressure.

4,088,079

COMBINATION RAIL, CONVEYOR CHAIN AND RETURN HANGER

Raymond A. Herzog, Cincinnati, Ohio, assignor to The Cincinnati Butchers' Supply Co., Cincinnati, Ohio

Filed Dec. 20, 1976, Ser. No. 752,021
Int. Cl.² E01B *25/24*
U.S. Cl. 104—111 **16 Claims**



1. A unitary device for suspending, from a single, overhead support, an elevated trolley rail and both the advancing and return reaches of an endless, flexible conveyor chain comprising:

a flat, rigid support plate;

at least two pairs of laterally spaced conveyor-chain supporting tracks;

a first pair of elongate, laterally spaced members depending from said support plate and located beneath the overhead support, said first pair of spaced members defining therebetween a support for one pair of laterally spaced tracks, wherein one member of said first pair extends downwardly beyond said tracks and terminates in a trolley-rail support on which a trolley hanger is supported and which is located beneath the overhead support;

a second pair of elongate, laterally spaced members depending from said support plate in lateral spaced relationship with said first pair of depending members, said second pair of members defining therebetween a support for a second pair of laterally spaced tracks and being laterally spaced apart from said trolley-rail support so that said trolley-rail support is located beneath only said first pair of tracks so that trolley hangers are located only beneath the overhead support whereby the most substantial portion of the weight carried by the device is in substantially vertical alignment with the overhead support; and

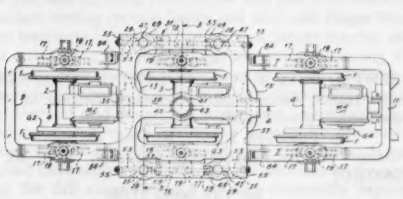
means securely, though releasably, mounting said support plate to the overhead support.

4,088,080

RAILWAY LOCOMOTIVE TRUCK

Keith L. Jackson, Granite City, Ill., assignor to General Steel Industries, Inc., St. Louis, Mo.

Filed Jul. 26, 1976, Ser. No. 708,722
Int. Cl.[2] B61C *3/00*; B61F *3/06, 5/06, 5/16*
U.S. Cl. 105—136 **10 Claims**



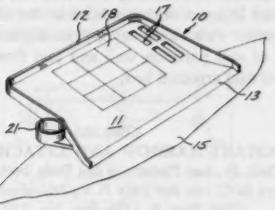
1. In a railway locomotive truck, at least two wheeled axles spaced apart longitudinally of the truck, a truck frame resiliently supported from said axles and having longitudinally extending side members arched over said axles and depressed therebetween, upright springs supported on the depressed portions of said side members outboard thereof, a bolster carried on said springs and having transverse structure overlying the depressed portions of said frame side members and its sides positioned transversely outwardly of said truck frame side members, upwardly facing bearing surfaces on said bolster spaced apart lengthwise of the truck and adapted for engagement with opposed downwardly facing bearings on a supported locomotive underframe, vertical axis pivot forming means on said bolster transverse structure adapted for mating engagement with corresponding means on a supported locomotive underframe, and a traction connection at each side of the truck between said truck frame side members and said bolster sides comprising a pair of longitudinally upwardly and outwardly inclined links connected at their lower ends to the respective truck frame side member and at their upper ends to the corresponding side of the bolster such that their axial projections intersect substantially at track level, said upwardly facing bearing surfaces being substantially in vertical alignment with said springs thereby permitting said bolster transverse structure to be sufficiently shallow to vertically clear said frame side members and said bolster sides to be sufficiently shallow to vertically clear the connections of said links to said truck frame side members during maximum compression of said springs.

4,088,081

CARD TRAY

Stephen S. D'Arca, Garden Grove, Calif., assignor to Alpha Nova Development Corp., Santa Ana, Calif.

Filed Jul. 18, 1977, Ser. No. 816,384
Int. Cl.[2] A47B *17/00*
U.S. Cl. 108—27 **5 Claims**



1. A tray assembly adapted to attach to the edge of a table, comprising:

a tray substantially parallel in planform including a bottom surface bounded along three edges by a peripheral edge strip and having a fourth edge chamfered to a taper;

an attachment strip formed on the underside of said bottom surface and extending normally therefrom, said attachment strip including a plurality of mounting slots extending partly thereacross and a corresponding plurality of cutouts equally offset from said mounting slots;

an attachment bracket formed in the manner of a first and second orthogonal flats joined in common along one edge said first flat including a plurality of attachment slots spaced in lateral separation to align with said mounting slots, said second flat including a plurality of stand-offs conformed for receipt in said cutouts, each said stand-off including a central bore aligned for mating with the said mounting slots, and a plurality of mounting holes, offset from said stand-offs to align with said mounting slots when said stand-offs are received in said cutouts; and

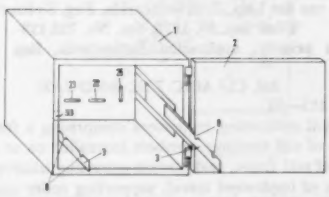
a plurality of attachment means alternatively secured in the common interior of said central bores, mounting holes and attachment slots and said mounting slots.

4,088,082

DEVICE WITH FUNCTIONAL UNITS HOUSED IN AN ARMORED BOX AND IN NEED OF PROTECTION, E.G. AUTOMATIC MONEY-DISPENSING MACHINE

Horst Pudras, Munich, Germany, assignor to G.A.O. Gesellschaft für Automation und Organisation mbH, Germany

Filed Jan. 14, 1977, Ser. No. 759,367
Claims priority, application Austria, Feb. 2, 1976, 715/76
Int. Cl.[2] E05G *1/06*
U.S. Cl. 109—53 **4 Claims**



1. A security bolt, comprising an armored box having an opening at one end, a closable door pivotally mounted adjacent said one end for opening and closing the opening, a suspension frame slide guide in said box extending along respective opposite sides of the interior thereof, a frame suspension slide guided in each slide guide, an open rectangular box frame carried on said frame suspension sides and having a bottom, a

front wall closing the front of said frame, a partition wall substantially parallel to said front wall and spaced rearwardly therefrom and dividing the interior frame into a front compartment between said front wall and said partition wall and a rear compartment between said wall and the rear of said frame, each front and rear compartment being adapted to contain separate functional units, and key openable lock means carried on said partition wall and said front wall and said armored box at a location adjacent said closable door for locking said frame against further withdrawal beyong the alignment of the associated one of said partition wall and said front wall with the opening of said armored box.

4,088,083

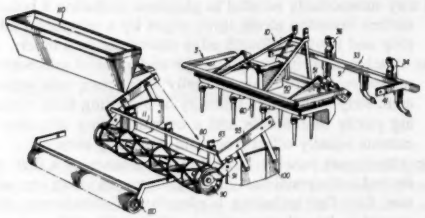
ROTARY HARROW AND ATTACHMENTS

John P. Dail, Jr., and Pieter van den Berg, both of Wilson, N.C., assignors to C. van der Lely N.V., Maasland, Netherlands

Filed Nov. 5, 1976, Ser. No. 739,299

Int. Cl.[2] A01B *49/06, 33/16*

U.S. Cl. 111—13 **8 Claims**



1. A tillage implement comprising a frame and a portion of said frame being supported by frame beams that extend in a direction transverse to the direction of travel, a plurality of soil working members being mounted on upwardly extending shafts that are connected to driving means supported by said frame portion, a ground engaging roller being located to the rear of said soil working members and said roller being pivotally interconnected to said frame by side arms with means that adjusts the relative position of said roller to said frame, a further beam supported between said arms and a downwardly depending leveler member being connected to the further beam, said leveler member being normally positioned forwardly of said roller and adjacent the rear of said soil working members to receive soil displaced by the soil working members in advance of the roller, pivot means detachably connecting said arms, together with said leveler member and roller, to the remainder of said implement.

4,088,084

SOIL CULTIVATING IMPLEMENTS

Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland

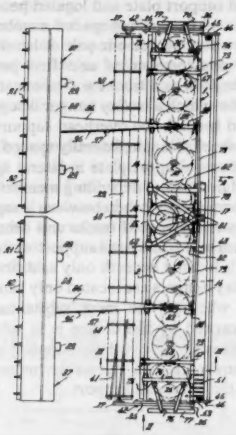
Filed Sep. 30, 1976, Ser. No. 728,118

Claims priority, application Netherlands, Sep. 30, 1975, 7511481

Int. Cl.[2] A01C *7/08;* B60D *1/00*

U.S. Cl. 111—52 **11 Claims**

1. A soil cultivating implement comprising a frame and a plurality of soil working members journalled on an elongated portion of said frame, said portion extending transverse to the direction of implement travel, supporting roller means being positioned to the rear of said portion and interconnected to said frame with adjusting means that regulates the working depths of the soil working members, pivotal means located on said frame portion and said pivotal means comprising two spaced coupling points on top of said frame portion for connection to further implement means, each point defining an upwardly extending axis about which said implement means is pivotable when connected to that point, said two coupling points being located in advance of said roller means with respect to the direction of travel, and above said soil working members, said



points being positioned at opposite sides of the center of said frame portion.

4,088,085

SEWING DEVICE FOR PRODUCING FORM SEAMS

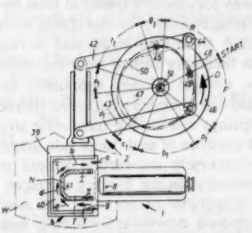
Walter Hager, Kaiserslautern, Germany, assignor to Pfaff Industriemaschinen GmbH, Germany

Filed Feb. 2, 1977, Ser. No. 764,814

Claims priority, application Germany, Feb. 20, 1976, 7605072[U]

Int. Cl.[2] D05B *21/00*

U.S. Cl. 112—121.12 **4 Claims**



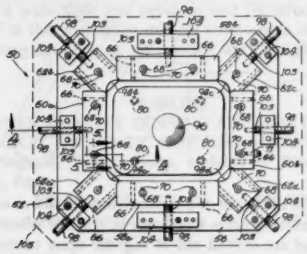
1. A sewing device for producing form seams usable with a sewing machine having a needle which reciprocates in respect to a cooperating rotary hook and which includes a guide mechanism for guiding a workpiece along a path corresponding to the configuration of the form seam with respect to the needle, comprising a workpiece support member having a stitch hole for the passage of the needle and having a force-away surface bounding the stitch hole, mounting means supporting said workpiece support for oscillatory back and forth movement and vertical movement between said needle and said hook, and actuating means connected to said mounting means to move said support member in timed relationship to the reciprocation of said needle and the movement of the workpiece and in a direction opposite to the movement of the workpiece with respect to the needle.

4,088,086

METHOD FOR SEAMING A LID TO A CONTAINER PAN

Roland E. Miller, Orangeville; Joseph A. Scaletta, Mount Prospect, and John Valek, Cicero, all of Ill., assignors to Kraft, Inc., Glenview, Ill.

Filed Jul. 22, 1976, Ser. No. 707,754
Int. Cl.[2] B21D *19/00*
U.S. Cl. 113—30 7 Claims



1. A method for securing a metallic lid onto an upper marginal edge of a rectangular upstanding peripheral wall of a rectangular metallic container pan so as to form a double lock seam therebetween about the full circumference of said marginal edge, said marginal edge being formed into a flange extending fully circumferentially of said peripheral wall and lying in a plane substantially perpendicular to said peripheral wall, said lid having a peripheral marginal surface defining an outer rectangular depending lip extending circumferentially of said lid, and said lid being received on said pan with said marginal surface resting on said flange and with said flange being disposed interiorly of said depending lip adjacent thereto, said method comprising the steps of: simultaneously forming the full periphery of said depending lip on said lid into juxtaposed relation with said flange, thereafter simultaneously forming the full periphery of said flange and juxtaposed lip on said lid so that said juxtaposed lip lies against the rectangular upstanding peripheral wall of said pan with said marginal surface of said lid exposed outwardly of said flange, and simultaneously compressing the full circumference of said outwardly exposed marginal surface of said lid, said flange and said juxtaposed lip of said lid firmly against said upstanding wall of said pan by a force applied in a direction substantially perpendicular to the plane of said exposed marginal surface of said lid whereby to form a double lock seam about the full circumference of said rectangular lid and pan.

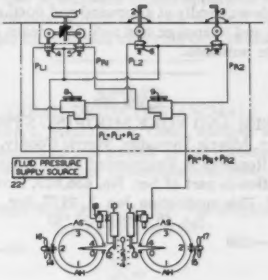
4,088,087

REMOTE CONTROL APPARATUS MARINE VESSELS HAVING DUAL PROPELLER SHAFTS

Akifumi Nitta, Kobe, Japan, assignor to The Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Dec. 16, 1976, Ser. No. 751,543
Claims priority, application Japan, Jan. 6, 1976, 51-1317
Int. Cl.[2] B63H *25/22*
U.S. Cl. 114—150 4 Claims

1. Remote control apparatus for marine vessels having dual propeller shafts and propellers mounted thereon, said control apparatus comprising a first and a second propeller shaft, each being pivotally anchored at one end and each being angularly displaceable about said one end relative to each other and to the axis of the vessel for effecting a corresponding change in the direction of the vessel's propulsion and movement, a steering wheel for steering the vessel, control valve means operable responsively to rotation of said steering wheel for producing a first fluid pressure control signal for effecting rotation of said first and second propeller shafts in the same direction in accordance with the angle of rotation of the steering wheel, a pair of independently operable forward and reverse levers, a first control valve device for producing a second fluid pressure control signal at a pressure corresponding to the amount of movement of one of said forward and reverse control levers and related to the first propeller, a second control valve device for producing a third fluid pressure control signal at a pressure corresponding to the amount of movement of the other of said forward and reverse control levers and related to the second propeller, a first positioner device for angularly displacing said first propeller shaft, a second positioner device for angularly displacing said second propeller shaft, a first relay valve device connected to said control valve means and to said first control valve device and operable responsively to said second control



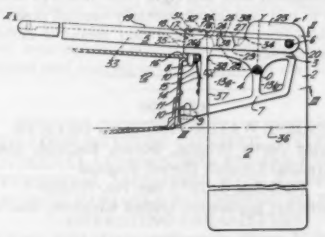
signal produced thereby for causing operation of said first positioner device and consequent angular displacement of said first propeller shaft accordingly, and a second relay valve device connected to said control valve means and to said second control valve device and operable responsively to said third control signal produced thereby for causing operation of said second positioner device and consequent angular displacement of said second propeller shaft accordingly, the amount of said angular displacement of said first and second propeller shafts being in accordance with the pressure of said second and third control signals, respectively.

4,088,088

PIVOTABLE RUDDER AND MEANS FOR SECURING IN VARIOUS POSITIONS

Douglas Ben Ian Proctor, "Fenmead" Brook Ave., Warsash, Hampshire, England

Filed Sep. 9, 1976, Ser. No. 721,829
Claims priority, application United Kingdom, Sep. 24, 1975, 39103/75
Int. Cl.[2] B63H *25/06*
U.S. Cl. 114—165 6 Claims



6. A rudder assembly comprising a stock member adapted to be mounted on the transom of a boat, a rudder blade pivotally mounted on the stock member and swingable in a substantially vertical plane from a lowermost generally vertical operative position rearwardly and upwardly to an uppermost generally horizontal inoperative position, an elongated tiller member extending forwardly from the rudder blade and from and above the stock member and having a rear end portion pivot-

ally connected with the rudder blade, said pivotal connection being located above and rearwardly of said pivotal mounting of the rudder blade when the rudder blade is in its lowermost position so that forward and rearward movement of the tiller member swings the rudder blade respectively upwardly and downwardly between said uppermost and lowermost positions, and inter-engageable securing means on said tiller and stock members having at least three discrete positions of engagement and arranged to be selectively engaged and disengaged to hold said rudder blade in its said lowermost and uppermost positions and at least one fixed intermediate position, and said tiller member being manually swingable upwardly and downwardly at a forward end portion respectively to disengage and to engage said securing means at each of said three discrete positions.

4,088,089

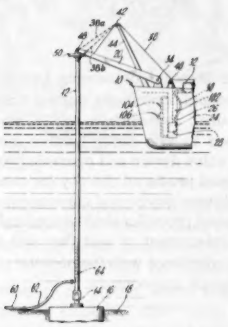
RISER AND YOKE MOORING SYSTEM

John F. Flory, Morris Township, Morris County, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 636,023, Nov. 28, 1975, abandoned. This application Jan. 3, 1977, Ser. No. 756,122

Int. Cl.[2] B63B *21/50*

U.S. Cl. 114—230 **48 Claims**



1. A mooring system for a vessel floating offshore in a body of water comprising: riser means attached to the bottom of said body of water and extending above the surface of said body of water in a normal substantially vertical position; rigid yoke means pivotally connected at one end to said vessel and at the other end to said riser means; means for permitting rotational movement of said vessel about said riser means; means for exerting tension on said riser means located on said vessel and operably connected with said rigid yoke means to restore said riser means to said normal substantially vertical position when motion of said vessel causes said riser means to deflect from said vertical position.

4,088,090

ENGINE WATER-TIGHTING DEVICES

Michael Brian Jervis Brinton, Dorset, England, assignor to RNLI (Trading) Limited, Dorset, England

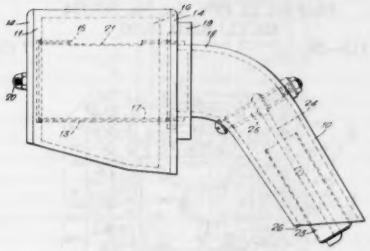
Filed Jan. 5, 1977, Ser. No. 757,093

Claims priority, application United Kingdom, Jan. 5, 1976, 210/76

Int. Cl.[2] B63H *21/26*

U.S. Cl. 115—17 **3 Claims**

1. An air-intake water-tighting device for an outboard motor including, on the engine air intake, a weight-operated swivel inlet valve that is open when the boat is running normally but closes under gravity in the event of a capsize, said inlet valve comprising a valve casing adapted to fit over the engine air intake, a horizontal sleeve fixed in the valve casing with a plenum or air space within the casing around the sleeve, a horizontal rotary barrel fitted within the sleeve able to rotate about the axis thereof, and an air inlet trunk outside the valve casing secured to one end of the barrel, the air trunk being weighted so that it turns the barrel through approximately 180°



in the sleeve in the event of a capsize, and the sleeve and barrel having cooperating ports which are in register when the boat is upright and are moved out of register upon turning of the barrel in the sleeve as aforesaid.

4,088,091

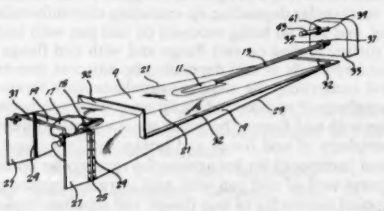
FIN ASSEMBLY FOR POWER BOATS

Richard J. Smith, 4072 Santa Lucia, Orange, Calif. 92665

Filed Nov. 3, 1976, Ser. No. 738,543

Int. Cl.[2] B63H *5/16*

U.S. Cl. 115—39 **7 Claims**



1. A fin structure for mounting in an opening in the hull of a power boat comprising:

An elongated rectangular panel adapted to be connected between the base edges of a pair of elongated fins, said panel having an opening therethrough adapted to receive a propeller shaft;

Each fin of said pair of fins having an unjoined leading edge, an unjoined trailing edge, and a base edge, said base edge being joined to said elongated rectangular panel to locate said pair of fins in substantially parallel alignment and to form a channel adapted to receive a propeller and the propeller shaft therein with the propeller in proximity of the trailing edges, said trailing edge of each fin having a length substantially shorter than the length of said leading edge and extending from one end of said base edge a distance greater than the most distant extremity of the propeller from said elongated rectangular panel, said leading edge extending from the end of said trailing edge and sloping forward to the other end of said base edge in a manner to maintain all points of said leading edge a greater distance from said rectangular panel than the propeller shaft received in said channel such that the propeller and propeller shaft are entirely contained within said channel formed between said pair of fins, the leading edges forming skids which protect the propeller and propeller shaft from being struck or damaged by objects greater in dimension than the spacing between said pair of fins, the slope of said leading edges offering a minimum resistance to movement through the water as well as enhancing the stability of the hull and the efficiency of the propeller; and

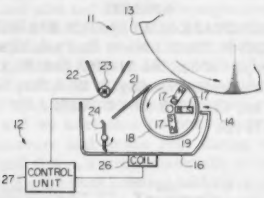
A mounting flange external to said channel and extending along each of said pair of fins from the juncture of said base edge and said leading edge to a point on each of said fins in proximity of said trailing edge and from said point on each of said fins to said base edge and between said base edges across said rectangular panel, said flange also extending along the edge of said rectangular panel between said juncture of said base edge and said leading edge of each of said fins and the hull of the boat, said flange forming a watertight seal between said fin structure and the hull of the boat when said fin structure is inserted into a rectangular opening cut into the stern and along the keel.

4,088,092

TONER DENSITY SENSING APPARATUS FOR ELECTROSTATIC COPYING MACHINE

Koichi Noguchi, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Apr. 25, 1977, Ser. No. 790,468
Claims priority, application Japan, Apr. 28, 1976, 51/48897
Int. Cl.[2] G03G *15/09*
U.S. Cl. 118—7 **15 Claims**



1. A density sensing apparatus for sensing a density of a powdered ferromagnetic mixture in a container, comprising,

an oscillator including a coil provided to the container so as to be magnetically coupled with the mixture, the oscillator being constructed such that an inductance of the coil and thereby a frequency of the oscillator are corresponding functions of said density; and

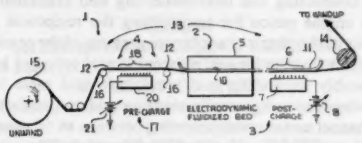
a demodulator for producing an electrical signal having a magnitude corresponding to said frequency and thereby said density, the demodulator comprising a phase locked loop.

4,088,093

WEB COATING AND POWDER FEED

Peter Naw Yank Pan, Country Club Hills, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Apr. 13, 1976, Ser. No. 676,513
Int. Cl.[2] B05B *5/02*
U.S. Cl. 118—630 **8 Claims**



1. An electrodynamic coating apparatus for powder coating a substrate with powder fed to said apparatus, said substrate being situated in a coating position adjacent to said apparatus, said apparatus comprising in combination:

fluidizing reservoir means for receiving said powder fed to said apparatus and for fluidizing said powder so as to provide fluidized powder for coating;

charging bed means disposed adjacent to said fluidizing reservoir means for receiving said fluidized powder provided for coating, and disposed adjacent to said coating position for charging said fluidized powder so as to cause electrostatic attraction of said fluidized powder to said substrate;

recharging means disposed between said charging bed means and said coating position for recharging said fluidized powder attracted to said substrate prior to coating of said substrate; and

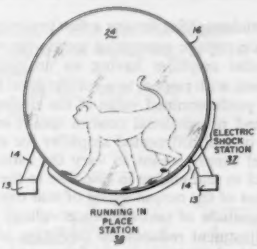
porous wall means between said fluidizing reservoir means and said charging bed means for containing said fluidized powder within said fluidizing reservoir means, and for providing passage of said fluidized powder from said fluidizing reservoir means to said charging bed means, whereby said powder fed to said apparatus may be fed to said apparatus at a high feed rate without harmful effect on the operation of said charging bed means.

4,088,094

TREAD DRUM FOR ANIMALS

Wayne H. Howard, Menlo Park, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 31, 1976, Ser. No. 672,223
Int. Cl.[2] A01K *15/00*
U.S. Cl. 119—29 **9 Claims**



1. In a tread drum for animals: housing means for rotation about an axis of revolution and dimensioned to contain therewithin an animal to be exercised, said housing means having a closed treadway portion on which the animal is to tread while said housing means and said treadway portion rotate about said axis of revolution;

said treadway having a plurality of electrodes capable of applying an electrical shock to an animal treading thereon when said electrodes are energized;

means for enabling, at a selected time, the selective energization of that portion of said electrodes that are located in a shock station region, said shock station region being immobile and behind a running-in-place region of said treadway whereby said animal can be shocked if it should fall behind said running-in-place region of said treadway.

4,088,095

CLOSED-LOOP MIXTURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE USING A DIFFERENTIAL AMPLIFIER WITH A REFERENCE VOLTAGE VARIABLE ACCORDING TO ENGINE OPERATING PARAMETERS

Shigeo Aono, Seki, Japan, assignor to Nissan Motor Company, Limited, Japan

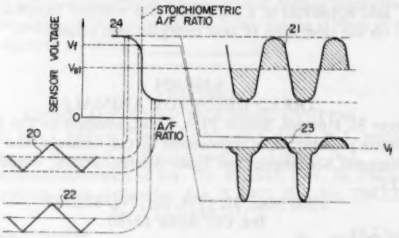
Filed May 17, 1976, Ser. No. 686,805
Claims priority, application Japan, May 20, 1975, 50-59297
Int. Cl.[2] F02M *7/00*; F02B *3/00*
U.S. Cl. 123—32 EE **2 Claims**

1. A closed loop fuel control system for an internal combustion engine including means for supplying air and fuel thereto in variable ratio and exhaust means including a catalytic converter which, when supplied with exhaust gases containing air

and fuel in a certain ratio, provides simultaneous oxidation of unburned fuel and reduction of nitrogen oxides, comprising:

an oxygen sensor for generating an output signal at one of high and low voltage levels depending upon whether the air to fuel ratio in said exhaust means is richer or leaner than a predetermined value and characterized by a nonlinear, substantially symmetrical voltage transition between said high and low voltage levels with respect to said predetermined value;

means for generating a reference voltage signal of variable magnitude representing an operating parameter of the engine;



a differential amplifier having a first input connected to said reference voltage generating means, the output from said differential amplifier having an unsymmetrical voltage waveform with respect to a voltage level that corresponds to said predetermined value of the air-fuel ratio;

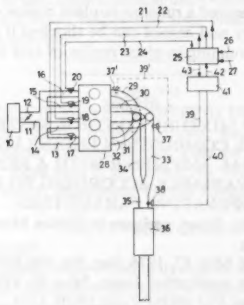
integral and proportional control means connected to the output of said differential amplifier for adjusting said air and fuel supply means to vary the ratio of air and fuel supplied to said engine in response to the direction of the deviation of the output signal of said oxygen sensor from the magnitude of said reference voltage signal, whereby said adjustment reduces the deviation of the ratio of air and fuel in the exhaust means from said certain ratio under varying operating parameter of said engine.

4,088,096

INTERNAL COMBUSTION ENGINE COMPRISING AN EXHAUST SYSTEM PROVIDED WITH PROBES FOR EXHAUST GAS ANALYSIS

Gianfranco Bossi, and Edoardo Rogora, both of Milan, Italy, assignors to Alfa Romeo S.p.A., Milan, Italy

Filed Feb. 15, 1977, Ser. No. 768,780
Claims priority, application Italy, Feb. 16, 1976, 20197 A/76
Int. Cl.² F02B *75/10*; F02D *35/00*
U.S. Cl. 123—32 EE **7 Claims**



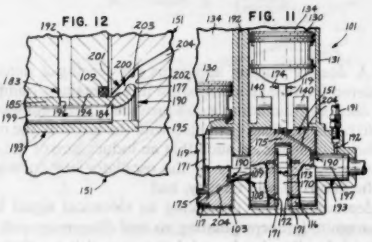
1. An internal combustion engine comprising devices for controlling the physical quantities relating to the operation of said engine and provided with an exhaust system constituted by an initial plurality of exhaust ducts of a number equal to the number of engine cylinders and flanged to the engine head, said exhaust ducts flowing together at least in pairs into individual ducts which in their turn flow into a single exhaust pipe, comprising at least two probes for analysing the exhaust gas, at least one of which is disposed in one of said ducts upstream of said single exhaust pipe, said probes being connected to said control devices in such a manner that at least one prechosen signal emitted by one of said probes is utilised as the parameter for controlling the physical quantities relating to the engine operation.

4,088,097

CRANKCASE-SCAVENGED ENGINE

Harold Litz, 2285 N. 7th St., North St. Paul, Minn. 55109

Continuation-in-part of Ser. No. 511,489, Oct. 30, 1974, Pat. No. 3,973,532. This application Aug. 9, 1976, Ser. No. 712,643
Int. Cl.² F02B *33/04*; F01M *1/04*
U.S. Cl. 123—73 AA **10 Claims**



6. An improved internal combustion engine of the type having a movable piston within a cylinder, wherein the improvement comprising:

(a) a crankcase with a crankshaft mounted therein for rotational movement, said crankshaft being connectable to a power shaft, said crankshaft further having an enlarged boss which defines at least one outwardly facing end surface;

(b) a connecting rod interconnecting said crankshaft with the engine piston for transmitting the reciprocal movement of the piston to a rotary movement of the crankshaft;

(c) a main bearing located adjacent to said enlarged boss for operably supporting said crankshaft, said main bearing having one end generally abutting said end surface;

(d) channel means communicating between an oil source and said main bearing to channel lubricating oil to said main bearing, said main bearing being so configured such that the lubricating oil is directed by the bearing to said one end of said main bearing;

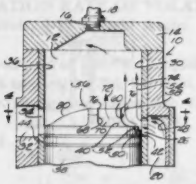
(e) said crankshaft containing directional cavity means in said end surface, said directional cavity means being in constant fluidic communication with said one end of said main bearing to receive the lubricating oil therefrom, said directional cavity means being configured to forceably direct lubricating oil from said main bearing to said connecting rod by centrifugal force in response to rotational movement of said crankshaft.

4,088,098

CROSS-SCAVENGED, TWO-CYCLE INTERNAL COMBUSTION ENGINE

Edgar Rose, Glencoe, and Richard A. Wlezien, Antioch, both of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Apr. 9, 1976, Ser. No. 675,531
Int. Cl.[2] F02F *3/24*
U.S. Cl. 123—73 A **10 Claims**



1. A two-cycle, internal combustion engine comprising an engine block, a cylinder in said engine block having a head and generally opposed inlet and outlet walls respectively including at least one intake port through which a fresh charge is admitted into said cylinder and at least one outlet port through which exhaust gases are exhausted from said cylinder, a piston mounted for reciprocative movement inside said cylinder, said piston having a top surface extending transversely to the axis of said cylinder and an inlet face portion which periodically covers and uncovers said intake port during reciprocative movement of said piston, a circumferentially extending recess in said piston at the juncture between said top surface and said inlet face portion, said recess having an inner wall which extends downwardly from said top surface in radially inward relation from said inlet face portion, said inner wall being in front of a limited portion of said intake port and located in closely adjacent proximity thereto such that, as said piston inlet face starts to uncover said intake port, an initial flow of fresh charge flows through only said limited portion of said intake port and is deflected by said recess inner wall towards said cylinder head and along said cylinder intake wall in a direction generally parallel to the longitudinal axis of said cylinder, and deflector means on said piston top surface and including a front face extending upwardly from said top surface in radially inwardly spaced relation from said inner wall and directly behind same at a greater distance from said inlet face portion than said inner wall, said deflector means deflecting additional streams of fresh charge flowing through the entire intake port, during subsequent uncovering thereof by said piston inlet face, towards said cylinder head inwardly from the initial stream of fresh charge so that said cylinder is progressively filled with fresh charge from said cylinder inlet wall towards said cylinder outlet wall.

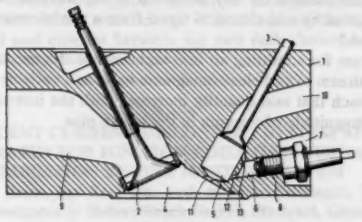
4,088,099

MIXTURE COMPRESSING, EXTERNAL AUTO-IGNITION FOUR-STROKE CYCLE INTERNAL COMBUSTION ENGINE

Dusan Gruden, Ditzingen, Germany, assignor to Porshce AG, Germany

Filed Aug. 19, 1976, Ser. No. 715,720
Claims priority, application Germany, Aug. 19, 1975, 2536775
Int. Cl.[2] F02B *19/10, 19/18*
U.S. Cl. 123—75 B **13 Claims**

1. A mixture compressing, external auto-ignition, four-stroke cycle internal combustion engine including stratified charging, in which the largest portion of the charge is supplied through at least one inlet valve as a fuel-lean fuel-air mixture to a main combustion space and the remaining portion of the charge being supplied as a fuel-rich fuel-air mixture to an auxiliary combustion chamber through at least one additional mixture inlet, wherein an ignition chamber is associated with the auxiliary combustion chamber and is connected to the auxiliary combustion chamber through at least one opening and in which a spark plug is arranged, characterized in that the volume (Vz) of the ignition chamber is in the following relationship to the volume (Vn) of the auxiliary combustion chamber: $Vz = (0.01 \text{ to } 0.1)\ Vn$.

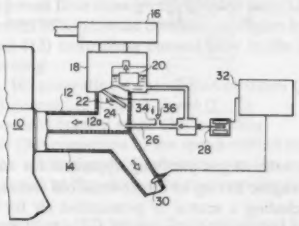


4,088,100

AIR/FUEL RATIO CONTROL SYSTEM IN INTERNAL COMBUSTION ENGINE

Naomi Tokura, Yokosuka, and Kenji Okamura, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Dec. 1, 1975, Ser. No. 636,658
Claims priority, application Japan, Dec. 2, 1974, 49-139069; Dec. 28, 1974, 50-1406
Int. Cl.[2] F02B *33/00*
U.S. Cl. 123—119 EC **4 Claims**



1. A system for supplying an air-fuel mixture to an internal combustion engine through an intake pipe including a throttle valve with the maintenance of a predetermined air/fuel ratio, the system comprising:

a carburetor located upstream of the throttle valve and adjusted to create constantly a first air/fuel ratio higher than the predetermined air/fuel ratio;

a conduit opening at one end into the intake pipe at a section downsteam of the throttle valve and at the other end to a source of fuel for the air-fuel mixture;

an electromagnetic valve which is of the on-off functioning type capable of selectively taking an open position and a closed position arranged to control the flow of said fuel through said conduit, said conduit and said electromagnetic valve being arranged such that said first air/fuel ratio is modulated to a second air/fuel ratio lower than the predetermined air/fuel ratio when the flow of said fuel in said conduit is maintained maximum;

means for sensing a concentration of a particular component of the exhaust gas in the exhaust system of the engine and producing an electrical signal representing the sensed concentration, said concentration being independence on the air/fuel ratio of an air-fuel mixture consumed in the combustion chamber of the engine;

means for intermittently opening said electromagnetic valve with a variable proportion of the period of remaining in said open position to the period of remaining in said closed

position in response to said electrical signal such that the mass flow rate of said fuel in said conduit is varied to compensate for any deviation of the air/fuel ratio indicated by said electrical signal from a predetermined ratio; and

means for admitting air into said conduit at a section downstream of said electromagnetic valve in a variable quantity such that said quantity increases with the increase in the magnitude of vacuum in the intake pipe.

4,088,101

EXHAUST GAS PURIFYING APPARATUS

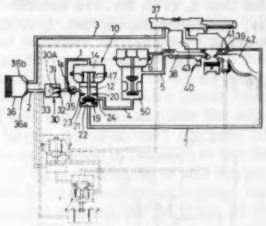
Nobuaki Wakita, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jun. 4, 1976, Ser. No. 693,123

Claims priority, application Japan, Dec. 27, 1975, 50-156491

Int. Cl.² F02M *23/08*

U.S. Cl. 123—119 A **6 Claims**



1. An exhaust gas purifying apparatus for an internal combustion engine having an intake manifold and an exhaust manifold, including a source of pressurized air for supplying primary air to said intake manifold and a fluid flow changeover valve coupling said source of pressurized air to said intake manifold, said valve comprising:

a housing defining a valve chamber therein and provided with a first port in fluid communication with said source of pressurized air through a first passage, a second port in fluid communication with said exhaust manifold through a second passage and a third port in fluid communication with said intake manifold through a third passage;

a valve element in said valve chamber;

valve seat means in said housing;

said valve element responsive to variations in pressure of said primary air for selective movement among three positions relative to said ports, said valve element being movable into a first position which allows fluid communication only between said second and third ports through said valve chamber when said primary air pressure is less than or equal to a first predetermined value, a second position which allows fluid communication both between said first and third ports and between said second and third ports through said valve chamber when said primary air pressure is higher than said first predetermined value, but lower than a second predetermined value, and a third position which allows fluid communication only between said first and third ports when said primary air pressure is greater than or equal to said second predetermined value, said first and second ports each defining a fluid inlet to said valve chamber and said third port a fluid outlet therefrom.

4,088,102

AUXILIARY ACCELERATION FUEL FEED DEVICE IN AN INTERNAL COMBUSTION ENGINE

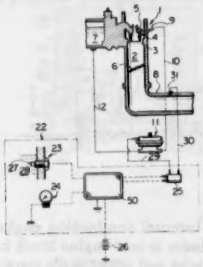
Takashi Kato, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 28, 1976, Ser. No. 736,462

Claims priority, application Japan, Jan. 30, 1976, 51-008314

Int. Cl.² F02M *7/06, 1/08;* F02D *19/06*

U.S. Cl. 123—119 R **5 Claims**



1. An auxiliary acceleration fuel feed device in an internal combustion engine used for a vehicle, said engine having in a fuel supply passage, a carburetor having an acceleration pump for feeding an acceleration fuel into the fuel supply passage at the time of acceleration, comprising;

an auxiliary accelerator nozzle disposed in the intake passage,

an auxiliary accelerator pump in a fuel conduit connecting a supply of fuel with the auxiliary accelerator nozzle, the pump being operatively connected to the intake passage downstream of a throttle valve of the carburetor through a vacuum conduit so as to feed an auxiliary acceleration fuel to said nozzle in response to a decrease in the vacuum in the vacuum conduit, and,

a vacuum control device in the vacuum conduit responsive to the engine temperature and the vehicle speed and arranged so as to close the vacuum conduit to prevent the supply of the fuel to the nozzle by the pump when the engine temperature is above a predetermined level and the vehicle speed is above a predetermined level.

4,088,103

ATOMIZING DEVICE

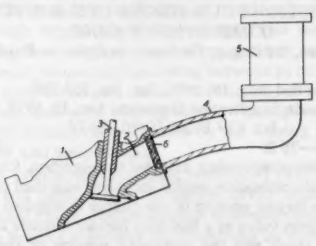
Peter John Raymond Brown, Bromley, England, assignor to Piper F.M. Limited, Ashford, England

Filed Feb. 2, 1976, Ser. No. 654,285

Claims priority, application United Kingdom, Feb. 6, 1975, 5190/75

Int. Cl.² F02M *29/00*

U.S. Cl. 123—141 **7 Claims**



1. An atomizing device with improved mechanical strength comprising a permeable member which is between substantially 0.08 and substantially 0.50 inch thick and which is com-

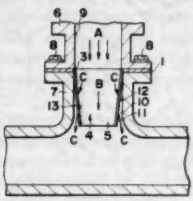
prised of a porous substance, the number of pores in said substance per linear inch being between substantially 10 and substantially 80, portions of the permeable member being integral while being permeable due to the pores in said substance for providing increased resistance to pulsating forces said permeable member is a foamed metal.

4,088,104

DEVICE AND METHOD FOR IMPROVING VAPORIZATION RATE OF VOLATILE FUELS

Jack Kenneth Ibbott, 4-17-7 Nishi Azabu, Minato-ku Tokyo, Japan

Continuation-in-part of Ser. No. 610,888, Sep. 5, 1975, abandoned. This application Jul. 21, 1976, Ser. No. 707,293
Claims priority, application Japan, Sep. 5, 1975, 50-84885
Int. Cl.[2] F02M *29/00*
U.S. Cl. 123—141 **10 Claims**



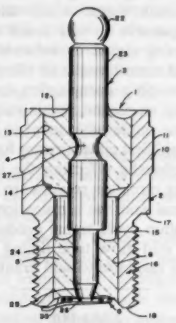
1. A vaporization device for use in an intake passage between a carburetor and combustion chambers in an internal combustion engine, said device comprising a tubular member having a peripheral wall defining an axial open passage therethrough, said peripheral wall being made of porous material having porosity of less than 12μ, said porosity being insufficient to allow passage through said wall of air and gaseous fuel.

4,088,105

GLOW PLUG

Vasanth K. Bhat, Cincinnati; Allen E. Siegel, Loveland; Richard E. Vogel, and Larry G. Burrows, both of Cincinnati, all of Ohio, assignors to Emerson Electric Co., St. Louis, Mo.

Filed Jul. 9, 1975, Ser. No. 594,560
Int. Cl.[2] F02P *19/00*
U.S. Cl. 123—145 A **12 Claims**



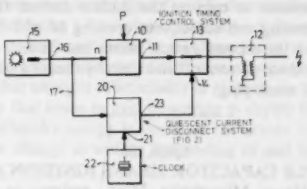
1. In a glow plug ignitor of the type used in small two-cycle internal combustion engines, having a hollow cylindrical casing and a central pin-terminal, the improvement comprising a substantially flat-spiral-coiled, flexible resistance element one end of which is electrically connected to said casing and the other to said pin-terminal, said element being oriented substantially perpendicularly to the axis of said pin-terminal and being normally substantially free of support between the said pin-terminal and said casing, a glass seal, fused to an interior wall of said hollow casing and to said pin-terminal and having a surface immediately behind said resistance element, closely adjacent said element but spaced therefrom through at least a major portion of the radial extent of said element, the spiral reaches of said element between the two ends thereof being radially inboard of said casing.

4,088,106

QUIESCENT CURRENT DISCONNECT SYSTEM AND APPARATUS FOR IGNITION COILS OF INTERNAL COMBUSTION ENGINE IGNITION SYSTEM

Wolfgang Borst, and Karl Ott, both of Schwieberdingen, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 30, 1976, Ser. No. 718,528
Claims priority, application Germany, Sep. 18, 1975, 2541594
Int. Cl.[2] F02P *9/00*
U.S. Cl. 123—146.5 D **6 Claims**



1. Ignition coil quiescent current disconnect system to interrupt current flow through the ignition coil (12) of the ignition system of an internal combustion engine by opening a switch (13) controlling current flow to the ignition coil, comprising

means (15, 16) generating a speed-control signal (f_n);

means (22) generating a clock signal (f_σ f_c);

and a disconnect control stage (20) including

a counter (30) connected to the speed-related signal (f_n) and the clock signal (f_c) counting out the speed related signal at the clock rate and providing a count signal

and a logic stage (32) having the count signal from the output of the count decoding stage (31) as well as the speed related signal (f_n) applied thereto and providing a disconnect signal upon logical combination of the speed related and the count signals.

4,088,107

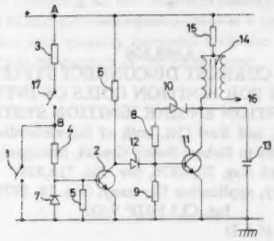
ELECTRONIC IGNITION CONTROL DEVICE FOR A MOTOR VEHICLE

Louis Jean Château, Rosny sur Bois, France, assignor to Ducellier et Cie., Paris Cedex, France

Filed Dec. 5, 1975, Ser. No. 637,955
Claims priority, application France, Dec. 18, 1974, 74 41725
Int. Cl.[2] F02P *1/00*; H05B *41/36*
U.S. Cl. 123—148 E **4 Claims**

1. An electronic ignition control device for an engine provided with at least one spark plug and with an electrical supply, comprising the combination of first and second switch means for periodic operation by the engine, a current limiting resistor connected in series with said first and second switch means across said supply, a first transistor having its base connected by said first switch means to one pole of said supply and by said second switch means and said current limiting resistor to the other pole of said supply whereby said first transistor is turned on only when said first switch means is open and said second switch means is closed, a second transistor having its base connected to said first transistor so that its conductivity is controlled thereby, and an ignition coil having a primary winding in in the collector-emitter circuit of the

second transistor and a secondary winding connected to said at least one spark plug, said second transistor being biased to conduct except when the first transistor is conductive, whereby opening of said second switch means causes said



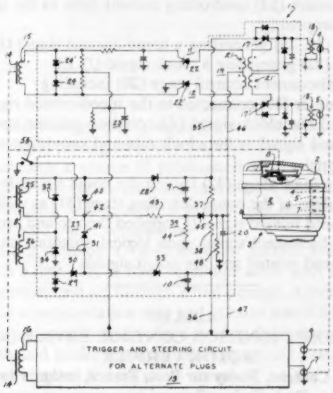
second transistor to turn on the initiate current flow in the primary winding and subsequent opening of said first switch means, after the second switch means has closed, causes the second transistor to turn off and thereby create a spark at said at least one spark plug.

4,088,108

MULTIPLE CAPACITOR MEANS IGNITION SYSTEM

James R. Hager, Minnetonka, Minn., assignor to Brunswick Corporation, Stokie, Ill.

Filed Jan. 19, 1976, Ser. No. 650,418
Int. Cl.[2] F02P *3/06, 1/08*
U.S. Cl. 123—148 CC **21 Claims**



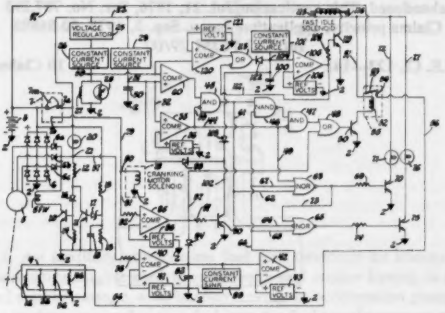
1. In an ignition system for an internal combustion engine having a power source producing an alternating current output including a positive polarity portion and a negative polarity portion, firing means for said engine, a plurality of separate power capacitor means connected to said firing means, a steering circuit including full wave rectifying means connecting the power source to said power capacitor means and polarized to conduct rectified positive polarity portions to first power capacitor means and rectified negative polarity portions to second power capacitor means for separately and sequentially charging of respective ones of said capacitor means to the same polarity and to a predetermined rectified potential, rectifier circuit means connected to said power source and to the trigger capacitor means for continuously supplying both said positive and negative polarity portions of said alternating current output to the trigger capacitor means for charging of said trigger capacitor means, and trigger means connecting the trigger capacitor means for alternately discharging said first and second power capacitor means.

4,088,109

DIESEL ENGINE WARM-UP CONTROL SYSTEM

William C. Woodruff, St. Charles, Mo.; Dennis M. Lombardo, Warren, and Theodore H. Horrell, Jr., Cortland, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 25, 1977, Ser. No. 772,241
Int. Cl.[2] F02N *17/00*
U.S. Cl. 123—179 H **8 Claims**



1. A Diesel enging warm-up control system for use with Diesel engines having at least one engine glow plug comprising in combination with a source of system operating potential: first circuit means for effecting the completion of a glow plug energizing circuit; means including a source of regulated direct current potential for producing an electrical engine temperature indicating signal of a potential magnitude inversely related to engine temperature; means for producing an electrical glow time timing signal which changes in potential magnitude with time at a rate determined by operating potential magnitude; second circuit means responsive to said engine temperature indicating and glow time timing signals for producing a timed glow plug energization cycle output signal while said engine temperature indicating signal is of a potential magnitude greater than said glow time timing signal whereby the duration of each glow plug energization cycle is a function of engine temperature and system operating potential magnitude; means for producing a crank signal while said engine is being cranked; means responsive to said crank signal for resetting said glow time timing signal to substantially zero thereby enabling said second circuit means to effect the production of another timed glow plug energization cycle output signal; means for producing an engine running signal while said engine is in the running mode subsequent to being cranked; and means included in said first circuit means for disabling said first circuit means and thereby effecting the interruption of said glow plug energizing circuit in response to the presence of said engine running signal and the termination of the said timed glow plug energization cycle signal produced by said second circuit means after said glow time timing signal was reset to substantially zero in response to said crank signal.

4,088,110

ENGINE IDLE CONTROL

Paul D. Sperline, Kennewick, Wash., assignor to SPS Instrument Company, Pasco, Wash.

Filed Oct. 29, 1976, Ser. No. 736,867
Int. Cl.[2] F02B *77/00*
U.S. Cl. 123—198 DB **1 Claim**

1. In an apparatus for maintaining operation of the electrical power control circuit of an internal combustion engine for a preselected period of time, the combination with an internal combustion engine, a direct current electrical power source, an

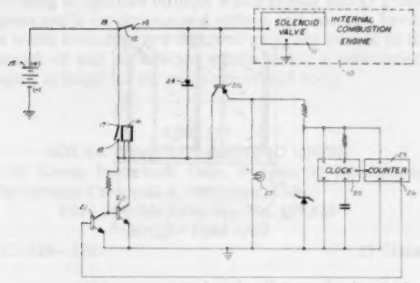
electrical load device operable to shut down the engine, and a power circuit connecting said power source to said electrical load device; said power circuit including a manual control switch having a first contact operatively connected to one side of the power source and a second contact operatively connected in series with the electrical load device to the remaining side of the power source; the manual control switch contacts being closed during normal operation of the power circuit and being open when the power circuit is normally inoperative;

the improvement comprising:

relay means including energizing means and a pair of normally nonconductive terminals controlled thereby and adapted to be rendered conductive upon activation of said energizing means, a first terminal of the relay means being operatively wired to the first contact of the manual control switch, the second terminal of the relay means being operatively wired in series with said energizing means to the remaining side of the power source;

electronic switching means having normally conductive terminals operatively wired in series between said second terminal of the relay means and the remaining side of the power source;

electronic timing means having an output terminal for producing an electrical signal at said output terminal following a predetermined period of time after activation of the electronic timing means;



first electronic sensing means operatively connected between the second contact of the manual control switch and said second terminal of the relay means for detection of the closing of the manual control switch, said first electronic sensing means being operable, upon detecting the closing of the manual control switch, to complete a current path across the power source through the manual control switch, the energizing means and the normally conductive terminal of said electronic switch means to thereby cause the first and second terminals of the relay means to be conductive;

second electronic sensing means operatively connected between the second contact of the manual control switch and the second terminal of the relay means and having normally nonconductive terminals wired in series between said second terminal of the relay means and said electronic timing means for detection of the opening of the manual control switch, said second electronic switching means being operable to activate said electronic timing means upon detecting an opening of the manual control switch;

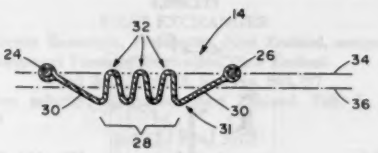
the output terminal of said electronic timing means being operatively connected to said electronic switching means for causing said normally conductive terminals thereof to become nonconductive upon production of an electrical signal by said electronic timing means, thereby opening the power circuit to said energizing means.

4,088,111

ARCHERY BOW

Yao Tzu Li, Lincoln, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 14, 1976, Ser. No. 676,829
Int. Cl.² F41B 5/00
U.S. Cl. 124—23 R **17 Claims**



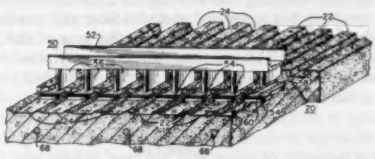
1. An archery bow comprising a pair of elastic limbs and a bowstring attached to the tips of said limbs, said limbs and said bowstring defining a bow plane, said limbs defining a longitudinal axis through said limbs in said bow plane, at least a first of said limbs having a shape, in a cross section perpendicular to said axis, that changes substantially in response to forces experienced by that limbs as said bowstring is drawn from its rest position; whereby energy is stored, in the drawn bow, by said limb shape change as well as by bending of said limbs in said bow plane.

4,088,112

AUTOMATIC RIB BREAKER

Henry Delmar Hight, Jr., Fort Worth, Tex., assignor to Martin Concrete Engineering Company, Fort Worth, Tex.

Continuation-in-part of Ser. No. 722,586, Sep. 13, 1976. This application Apr. 6, 1977, Ser. No. 785,067
Int. Cl.² B28D 1/00
U.S. Cl. 125—2 **4 Claims**



1. Apparatus for fracturing projecting rib portions of a concrete slab of the type having a ribbed surface finish comprising, in combination:

a pallet for supporting the concrete slab in a position permitting access to the ribbed surface;

a carriage mounted for movement along the length of the pallet and over the ribbed surface of the slab in a direction parallel to the orientation of the ribs;

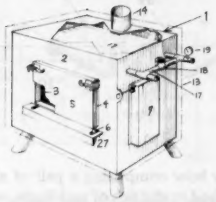
an array of wedges secured to the carriage, each of the wedges having a nose portion for insertion into a channel lying between an adjacent pair of ribs and having a shoulder portion wider than the channel for shearing and forcibly displacing portions of the adjacent ribs as the wedge is drawn through the channel; and,

means for propelling the carriage along the length of the slab and in a direction parallel to the orientation of the ribs with the wedges disposed in shearing engagement with the rib portions.

4,088,113
WOOD BURNING AUTOMATIC SWIMMING POOL HEATER

Kendrick H. McIntire, Rte. 2, Box 1000, and John E. McIntire, Rte. 2, Box 151-A, both of Aurora, Oreg. 97002

Filed Aug. 2, 1976, Ser. No. 710,441
Int. Cl.[2] F24B 9/04
U.S. Cl. 126—132 **7 Claims**

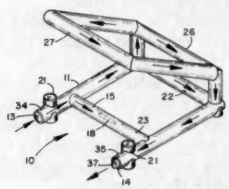


1. A wood-fueled, automatic heater comprising:
a body having a surrounding side wall, top and bottom, defining in the lowermost portion thereof a fuel combustion chamber,
a pre-heating down draft manifold communicating with said fuel chamber combustion chamber with inlet adjacent to the lower part of said body,
a damper in the upper part of said down draft manifold,
a thermostat so mounted as to respond predominantly to heater temperature for moving said damper in closing direction as heater temperature rises,
said manifold heating air as it moves in a downward direction toward the primary combustion area,
draft tubes mounted to the upper rear wall of body extending inwardly and upwardly toward the upper area of the fuel combustion chamber admitting air under all combustion conditions and presenting portions thereof to the combustion area to cause a preheating of said secondary air tubes and thus a pre-heating of entering secondary air,
a flat, horizontal heat exchanger in the upper portion of the body and spaced downwardly from the top,
a baffle positioned just above the heat exchanger and immediately below the inside upper portion of the body and attached to the body on three sides leaving a space for escaping smoke and gases toward the front of the chamber in effect trapping and holding the combustion process and resulting hot gases and radiated heat and confining and holding such gases and heat in the area of the heat exchanger for a longer time than ordinarily possible,
and a collar on the upper rear portion of the body to accept a smoke pipe.

4,088,114
FIREPLACE HEATER

John Johnson, 3695 Hunter St., Glen Avon Heights, Calif. 92509

Filed Aug. 12, 1976, Ser. No. 713,888
Int. Cl.[2] F24B 7/00
U.S. Cl. 126—164 **7 Claims**

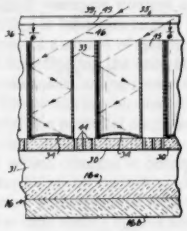


6. A fireplace heater, comprising:
a first plurality of air conduits forming a fireplace grate including a pair of side conduits to extend along the sides of a fireplace, each of said conduits having at least one inlet and at least one outlet;
a second plurality of air conduits disposed over said fireplace grate, each of said conduits having at least one inlet and at least one outlet;
air conduit means connecting said first and second plurality of air conduits to form a heater system, each member of said air conduit means having at least one inlet and at least one outlet;
an inlet to one of said side conduits forming an entrance to said heater system and an outlet from the other of said pair of side conduits forming an exit from said heater system;
each of the remainder of said inlets being connected to the outlet of another conduit, and each of the remainder of said outlets being connected to the inlet of another conduit; and
air moving means in communication with said entrance of said heater system for the circulation of air from said entrance through each of said conduits to the exit of said heater system, without counterflow.

4,088,115
SOLAR HEATING SYSTEM

Charles E. Powell, 15510 Tonekai Rd., Apt. F, Apple Valley, Calif. 92037

Filed Aug. 19, 1976, Ser. No. 715,711
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 **11 Claims**



1. A solar heat collecting device comprising
a panel,
a plurality of nested hollow cylindrical solar heat collector-convertor members supported over said panel with the axes of said members extending perpendicular to said panel,
said panel having openings therethrough at locations intermediate said members,
a transparent pane extending over said members and spaced therefrom to form a space,
enclosure means extending between said panel and said pane to enclose said space, and
means for passing air to be heated into said space, along said members and outwardly through said openings.

4,088,116
RADIANT ENERGY COLLECTOR

Jose Pastor, 191 Wilton Rd., Westport, Conn. 06880

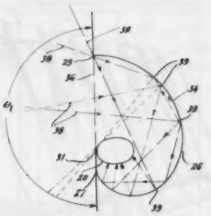
Filed Jan. 6, 1976, Ser. No. 646,974
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 **31 Claims**

1. A radiant energy collector comprising:
A. an elongated reflective surface means having a curved surface for reflecting radiant energy which is incident on said curved surface, said surface means having a length and an edge, said edge extending in a direction of said length, and said curved surface curving continuously in a direction normal to said length;
B. an elongated energy conversion means comprising a body

extending in the direction of said length adjacent said edge and positioned with respect to said reflective surface means for impingement by radiant energy which is reflected from said curved surface toward said body;

C. said body having a plurality of cross sections which are defined by the intersection of the body with planes of incidence of substantially all radiant energy impinging on said curved surface;

D. said reflective curved surface having a plurality of reflective half-planes each defined by a normal to said curved surface and by a reflected ray from said surface;



E. said body and said reflective curved surface relatively positioned for providing that said cross sections are located within said reflected half-planes and said normals are contiguous with peripheries of said cross sections;

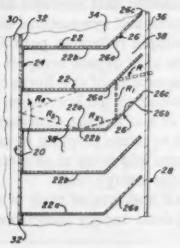
F. said relative positioning of said body and curved surface forming an aperture through which radiant energy propagates and is incident on said surface, said aperture having a width extending in a direction generally normal to the length of said surface and which width is substantially equal in length to the perimeter of said body.

4,088,117

SOLAR HEAT COLLECTING UNITS

John H. Keyes, Nederland, Colo., assignor to International Solarthermics Corporation, Nederland, Colo.

Filed Jun. 24, 1976, Ser. No. 699,528
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 **17 Claims**



1. A solar heat collecting plate for absorbing solar energy in a solar collector comprising:

a first relatively planar plate portion having a first surface and an oppositely positioned second surface, and first and second surfaces of said first plate portion being absorptive of solar radiation;

a second relatively planar portion having a first surface and an oppositely positioned second surface, the first surface of said second plate portion being absorptive of solar radiation, the second surface of said second plate portion being reflective of solar radiation, said second plate portion forming an obtuse angular extension from said first plate portion, the first surface of said second plate portion forming an obtuse angle with respect to the first surface of said first plate portion, and the second surface of the second plate portion forming an angle between 180° and 270° with respect to the second surface of said first plate portion; and

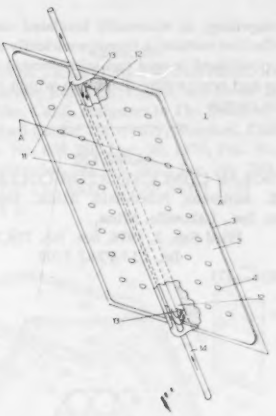
mounting means operatively associated with said first and second plate portions for positioning the first and second surfaces of said first plate portion and the first surface of said second plate portion to absorb solar radiation.

4,088,118

HEAT EXCHANGER

Roy Fergus Benseman, Wellington, New Zealand, assignor to Development Finance Corporation, New Zealand

Filed Jan. 28, 1975, Ser. No. 544,797
Claims priority, application New Zealand, Feb. 5, 1974, 173279
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **1 Claim**



1. In a solar collector for heating a liquid by solar energy, a solar absorber plate comprising a hollow plate completely filled with a primary liquid, said hollow plate in use being inclined with respect to the horizontal, at least one liquid-conducting pipe of heat conducting material in thermal contact with the primary liquid filling the hollow plate and adapted to convey a secondary liquid to be heated by solar energy, the hollow plate having a first face having an internal and external surface which is opaque to and an absorber of radiant energy applied to the external surface of the first face of the plate so that radiant energy causes the primary liquid adjacent to said first face to be heated and a convective circulation to develop within the plate of primary liquid which moves upwards past said first face, said at least one pipe being so arranged in relation to the hollow plate that it lies in the path of the bulk of the downward moving primary liquid of the convective system wherein said at least one pipe passes through the hollow plate within a groove extending into a back face portion of the hollow plate, said groove defining a baffle on one side of said one pipe, and a flat strip extending along and over the groove, except at the ends thereof, forming a baffle on the other side of said at least one pipe.

4,088,119

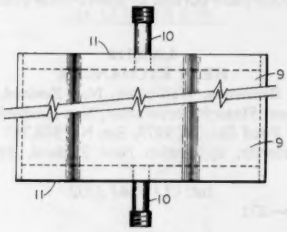
MEANS AND METHODS OF PREVENTING THE LOSS OF SOLAR HEAT

Edward J. O'Hanlon, Assembly Point, Lake George, N.Y. 12845

Filed Dec. 4, 1975, Ser. No. 637,638
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **4 Claims**

1. In a solar heat collecting system having a solar heat collecting working fluid moving in a piping circuit between a

solar heat collector and a solar heat storage unit thermometric means positioned within said piping circuit for interrupting the flow of said solar heat collecting working fluid in accordance with the temporary absence of the direct rays of the sun contributing the solar heat to said solar heat collecting system, said



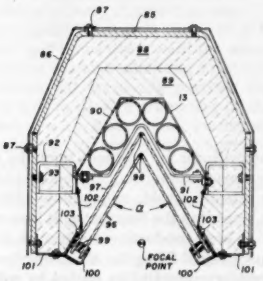
means comprising, an externally insulated can with an inner highly reflective surface, a thermometrically sensitive element centrally positioned in said can said element connected to an expanding and contracting diaphram which opens and closes an electric circuit.

4,088,120

SOLAR CONCENTRATOR-COLLECTOR

Donald E. Anderson, Northfield, Minn., assignor to Suntec Systems, Inc., Lakeville, Minn.

Filed Sep. 2, 1976, Ser. No. 719,732
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **17 Claims**



1. In a solar heat concentrator and collector comprising, in combination, solar radiation concentrator means and radiation collector means including a shroud enclosing an absorber means therewithin, and a window means within said shroud for transmitting concentrated solar energy from said concentrator means to said absorber means;

(a) said solar concentrator means comprising lateral support columns and means for controllably positioning a plurality of elongated reflective surfaces mounted on said lateral support columns in solar viewing and absorber reflecting disposition;

(b) said absorber means including an elongated fluid transfer duct disposed within said shroud and having a cylindrical axis extending generally parallel to the elongated axis of each of said plurality of reflective surfaces;

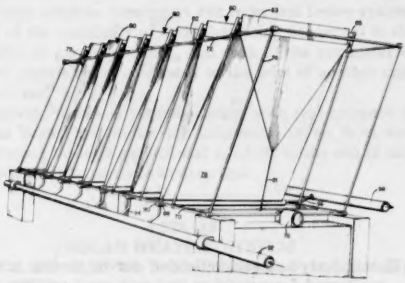
(c) said shroud defining a generally closed loop with a radiation transmissive window therealong, said window comprising a radiation permeable member having an outer surface concave to said concentrator means and defining a transmissive path for a substantial portion of the radiation received by said collector means from said concentrator means, and defining a re-entrant path for radiation which is reflected from said outer concave surface, said re-entrant path extending from a first point along said outer concave surface to a second point along said outer concave surface remote from said first point.

4,088,121

SOLAR ENERGY CONCENTRATOR

James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, New Orleans, La.

Filed Jan. 19, 1977, Ser. No. 760,558
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **3 Claims**



1. A solar energy concentrator comprising:

a parallelogram linkage structure composed of top, bottom and side members and tiltable to cause forward and rearward tilting movement of the side members, with the top and bottom members remaining parallel over the range of tilting movement;

a flexible continuous sheet material having a reflective surface disposed in a zig-zag path between the lower and upper members of said linkage structure to provide a linear array of horns;

means for securing said sheet material to said linkage structure to maintain said sheet in a taut condition throughout the range of tilting movement of said linkage structure;

each of said horns including two planar converging, confronting surfaces reflective to incident solar energy, each horn extending between an entrance aperture at the top of said linkage structure and symmetrical about the horn axis, and a smaller exit aperture at the bottom of said linkage structure and symmetrical about the horn axis to provide a multiple reflective path for incident solar energy, the horn axes of said array of horns being parallel, the entrance apertures of said horns lying in a plane generally perpendicular to the horn axes;

means coupled to said linkage structure and operative to tilt said structure to cause pivoting in unison of said array of horns to dispose said array at an intended angular relation to incident solar energy; and

means at the exit aperture of each of said horns to receive concentrated solar energy therefrom.

4,088,122

FIELD BURNING APPARATUS

Thomas R. Miles, Portland, Oreg., assignor to State of Oregon, Salem, Oreg.

Filed Aug. 11, 1976, Ser. No. 713,444
Int. Cl.² F23C *5/00*
U.S. Cl. 126—271.2 R **25 Claims**

1. Apparatus for burning combustible material on the ground to thermally cultivate a field comprising:

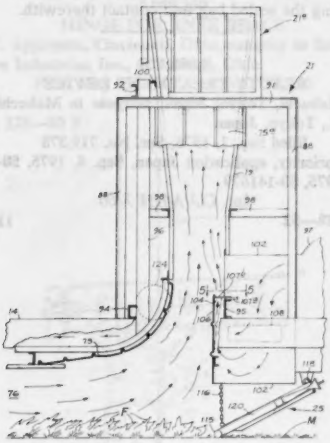
wheel supported vehicle means having a frame and a frame-connected cover means, said cover means being elevated from the ground and including side portions for defining a burning chamber;

means disposed in said burning chamber operable for initially igniting combustible material on the ground;

draft stack means disposed adjacent to a forward end of said

vehicle means, said stack means communicating directly with said burning chamber and extending generally upwardly from said cover means; and

air mover means disposed adjacent to said stack means operable for inducing a draft upwardly through said stack means by delivering ambient air thereinto so that a negative pressure is developed within said burning chamber, air and gaseous products of combustion being drawn from said burning chamber upwardly through said stack means for continuously advancing fire against unburned combustible material in the forward direction of travel of said vehicle means.

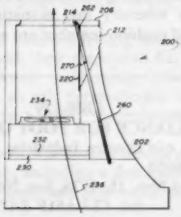


4,088,123

VENTING AND RECIRCULATING VENT KITCHEN HOOD

Leon O. Bowen, Jr., and Michael T. McVean, both of Cleburne, Tex., assignors to Rangaire Corporation, Cleburne, Tex.

Filed Jun. 28, 1976, Ser. No. 700,216
Int. Cl.[2] F24C *15/08*; F23J *11/00*
U.S. Cl. 126—299 D **2 Claims**



1. A kitchen stove hood for selectively providing air ventilation or recirculation in a kitchen area comprising:

a hood dimensioned to be disposed in the kitchen area over a stove and having top, bottom, sides, back and front portions;

said hood including an air intake opening at said bottom portion;

a fan for causing air from the kitchen area to flow through said air intake opening;

an air recirculation outlet in said hood for recirculating air to the kitchen area;

an air vent outlet in said hood for venting air from the kitchen area;

a damper blade mounted for movement between a first position adjacent said recirculation outlet and a second position adjacent said vent outlet for selectively opening and closing said outlets; and

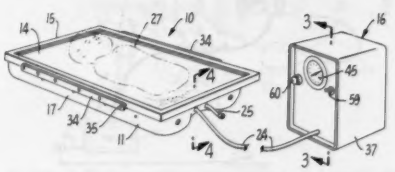
a link having first and second ends and pivotally mounted to said hood between said first and second ends of said link, said first end being pivotally connected to said damper blade and said second end being accessible to the operator through said air intake opening, the operator imparting lateral movement to said link, such that when said link is in its rearmost position said damper blade is in said second position to close said vent outlet to permit air to recirculate into the kitchen area and when said link is in its forwardmost position said damper blade is in said first position to close said recirculation outlet to permit air to vent outside the kitchen area.

4,088,124

METHOD FOR TREATING PREMATURE INFANTS

Anneliese F. Korner; Robert L. Piziali, and Orval T. Ellsworth, all of Palo Alto, Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Division of Ser. No. 639,288, Dec. 10, 1975, Pat. No. 4,048,684.
This application Jan. 17, 1977, Ser. No. 760,125
Int. Cl.[2] A61B *19/00*; A61H *1/00*
U.S. Cl. 128—1 B **3 Claims**



1. A method for treating a premature infant comprising:

(a) providing a contained fluid medium on which the infant may be placed such that the infant is substantially wholly supported by the fluid medium;

(b) placing the infant on the contained fluid medium such that the infant is substantially wholly supported by the fluid medium; and

(c) forming random oscillations in the fluid medium of low amplitude and predetermined frequency.

4,088,125

METHOD AND APPARATUS FOR MONITORING SKIN POTENTIAL RESPONSE

Albert G. Forgione, Marblehead, and Richard M. Horton, Duxbury, both of Mass., assignors to Cyborg Corporation, Boston, Mass.

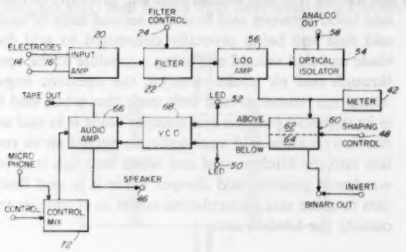
Filed Nov. 19, 1976, Ser. No. 743,096
Int. Cl.[2] A61B *5/05*
U.S. Cl. 128—2.1 Z **9 Claims**

1. The method of training a subject in the control of autonomic functions of the subject comprising the steps of

(a) monitoring the alternating skin potential signals having positive and negative components with respect to zero potential produced by the subject in response to stimulation of the subject,

(b) comparing said alternating skin potential signals to a variable reference signal having positive and negative components with respect to zero, and,

(c) generating a feedback signal to said subject whenever said positive and negative components of said skin potential signals are out of comparison with said positive and negative components of said reference signal respectively.



4,088,126

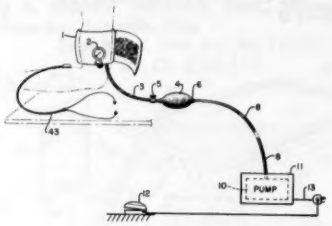
DEVICE FOR MEASURING BLOOD PRESSURE

John M. Gemind, Copley, Ohio

Filed May 24, 1976, Ser. No. 689,074

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—2.05 G **5 Claims**



1. A device for use in measuring blood pressure comprising, in combination, an inflatable cuff means for stopping blood flow in a patient's arm, pressure gauge means operatively associated with said cuff for indicating the pressure in said cuff, an electrically powered vibrating pump, a single passage means extending between said pump and said cuff for inflating and deflating said cuff, a bleed-off valve means in said passage for releasing pressure in said cuff, a hand pressurizing bulb disposed in said passage means, said device being further characterized by said pump being a diaphram type pump and including a check valve means for cooperating with said bulb to inflate said cuff by hand.

4,088,127

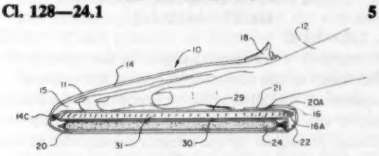
MASSAGE APPLIANCE

Donna M. Clayton, 1691 Hyacinth La., and Donna J. Martinez, 1803 Rosswood Dr., both of San Jose, Calif. 95124

Filed Jan. 21, 1977, Ser. No. 761,013

Int. Cl.[2] A61H *29/00*

U.S. Cl. 128—24.1 **5 Claims**



1. A massage appliance comprising:

a mitt forming a pocket into which a hand can be inserted and having a pad adjacent the palm of the hand;

a pliable sealed bag filled with fluid and being of an approximate size to cover at least a portion of the hand; and

means fixing said bag to the palm side of the mitt whereby said mitt can be used to massage the parts of the body by bringing the sealed bag into contact therewith.

4,088,128

BEAUTY TREATMENT DEVICE

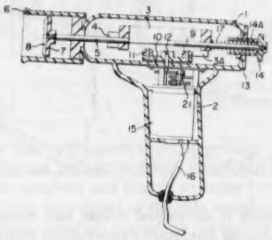
Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co., Ltd., Tokyo, Japan

Filed Sep. 1, 1976, Ser. No. 719,378

Claims priority, application Japan, Sep. 4, 1975, 50-107600; Oct. 16, 1975, 50-141679

Int. Cl.[2] A61H *7/00*

U.S. Cl. 128—52 **11 Claims**



1. A beauty treatment device for the skin comprising a device body, a drive unit including a motor provided in said device body, acutating means disposed in said device body, at least one spring shaft slidably coupled to said actuating means, at least one spring, said spring being disposed about said spring shaft with one end of said spring contacting said actuating means, adjusting means secured to the other end of the said spring for varying the energy stored therein, means for releasing the energy of said spring whereby said spring drives said actuating means, a plate member mounted on said acutating means, a cushion member mounted on a surface of said plate member and an open ended space guide mounted on said device body for maintaining the range of the movement of said actuating means whereby said actuating means, said plate member, and said cushion member are arranged to repeatedly tap the skin.

4,088,129

APPLIANCE FOR FOOT ORTHOSIS

Mario DiGiulio, c/o Spectra Industries Corp., 405 Baily Rd., Yeadon, Pa. 19050

Filed Nov. 15, 1976, Ser. No. 741,798

Int. Cl.[2] A61F *3/00*

U.S. Cl. 128—80 A **21 Claims**

1. A foot orthosis appliance kit comprising:

an elongated rigid bar;

a pair of lockable articulated joint means, each having a first part adapted to be secured to said bar, a second part secured to said first part and both rotatable and universally articulable with respect to said first part, and means for locking said first and second parts in any desired relationship within a range of rotation, flexion and inversion and eversion;

clip means, fixed to the said second part of each of said

articulated joint means, for releasable rigid attachment to a corresponding shoe clip; and

a pair of shoe clips each adapted to be secured to the sole of a shoe, and each being adapted for releasable rigid attachment to a corresponding one of said clip means.

4,088,130

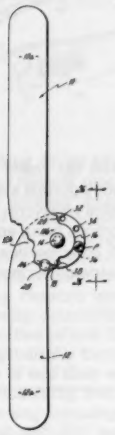
HINGE FOR KNEE BRACE

Leslie T. Applegate, Cincinnati, Ohio, assignor to Surgical Appliance Industries, Inc., Cincinnati, Ohio

Filed May 16, 1977, Ser. No. 797,120

Int. Cl.² A61F *3/00*

U.S. Cl. 128—80 F **4 Claims**



1. A knee-stabilizing hinge for a tubular knee-encircling sleeve having upper and lower hinge-receiving pockets disposed on each side of said sleeve, said hinge comprising:

an upper hinge element having an upper elongaged arm receivable in an upper pocket of a knee-encircling sleeve and a lower section of generally flat configuration,

a lower hinge element having a lower elongated arm receivable in a lower pocket of said knee-encircling sleeve disposed below and on the same side of the knee as said upper pocket, said lower hinge element having an upper section of generally flat configuration,

a pivotal connector interconnecting said upper and lower hinge elements with their respective flat sections in face-to-face superimposed overlapping relation for pivotal movement about an axis perpendicular to the respective planes of said face-to-face superimposed overlapping hinge sections,

one of said upper or lower hinge element sections having a first arcuate notch, including a first circular arc segment centered on said axis, said first notch defining at least a first shoulder,

said one of said upper or lower hinge element sections having a second arcuate notch, including a second circular arc segment centered on said axis at a distance therefrom different from that of said first notch, said second notch defining at least a second shoulder,

a pin permanently secured to said section of the other of said upper or lower hinge elements at a point to abut said second shoulder when said first and second hinge elements form an approximate angle of 180° to preclude angulation of said hinge elements beyond approximately 180°,

a selectively removable pin,

a first aperture disposed in said section of said other hinge element at a point proximate said first shoulder when said first and second hinge elements form an approximate angle of 180° to facilitate, in conjunction with said permanent pin and second shoulder, locking said hinge elements at an angle of approximately 180° when said selectively removable pin engages said first aperture in abutting relation to said first shoulder,

at least one additional aperture in said section of said other hinge element at a point intermediate said permanent pin and first aperture for receiving said removable pin to abut said first shoulder when said hinge elements are angulated to form a predetermined angle substantially less than 180° thereby precluding angulation of said hinge elements to an angle less than said predetermined angle,

whereby only a permanent pin and associated shoulder and a removable pin cooperating with two apertures are needed to selectively either lock said hinge elements at approximately 180° or limit angulation to a predetermined lesser angle.

4,088,131

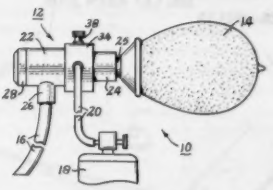
BREATHING ASSISTANCE DEVICE

James O. Elam, Chicago, Ill., and Hans Rudolph, Kansas City, Mo., assignors to Jim E. Rand Training Systems, Inc., Chicago, Ill., a part interest; by said James Elam

Filed Apr. 11, 1974, Ser. No. 460,139

Int. Cl.² A61M *16/00*

U.S. Cl. 128—145.7 **11 Claims**



1. A lung inflation system, comprising, in combination, a manual compression-bag with a single inlet-outlet opening, a non-rebreathing valve connected to said opening, and gas control means for admitting to said opening air and oxygen from a pressurized source for filling said bag, and for exhausting to ambient oxygen in excess of the amount necessary to fill said bag, said gas control means including oxygen and air inlets, and a rotary member rotatable to a plurality of positions to selectively occlude said air and oxygen inlets, said valve including a cylindrical valve body, a transverse cylindrical extension therefrom, said air and oxygen inlets being located in said extension, and said rotary member being rotatably mounted with respect to said extension and having passageways communicating said inlets with the interior of said cylindrical valve body and being rotatable to bring said passageways selectively into alignment with said inlets.

4,088,132

HYDROPHILIC POLYURETHANE FOAMS FOR USE IN CATAMENIAL DEVICES

Louis L. Wood, Rockville, Md.; Jerome L. Murray, New York, N.Y., and Frances R. Gardiner, Sparta, N.J., assignors to W. R. Grace & Co., New York, N.Y.

Filed May 7, 1975, Ser. No. 575,356

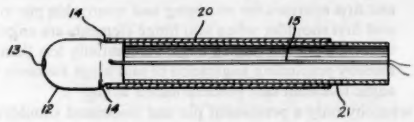
Int. Cl.² A61F *13/20*

U.S. Cl. 128—285 **13 Claims**

1. A tampon assembly comprising:

a segment of compressed hydrophilic polymeric foam impregnated with about 10 to 200 percent by weight of an inorganic, water insoluble particulate material having an average particle size of about 0.1 to 100 microns and in compression to less than 50 percent of its original dry volume, wherein said solid particulate material is uni-

formly entrained within the cell structure of said hydrophilic foam and keeps the cell walls of said foam apart during compression, and prevents the formation of a bond therebetween, thereby facilitating the accelerated water uptake upon contact therewith;



a water soluble container substantially encasing and holding said segment in said compression along the entire length thereof, which provides lubrication for insertion of said segment into an animal's body cavity and is adapted for rapid disintegration therein; and

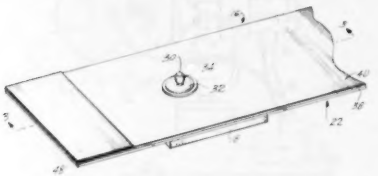
removable insertion means axially communicating with said container to insert said segment into said body cavity.

4,088,133

ELECTRODE FOR ELECTROSURGICAL PROCEDURE

Max E. Twentier, Phoenix, Ariz., assignor to Products International Company, Phoenix, Ariz.

Filed Sep. 13, 1976, Ser. No. 722,635
Int. Cl.[2] A61N *3/06*
U.S. Cl. 128—303.13 **12 Claims**



1. An indifferent electrode for use in electrosurgical procedures with an electrosurgical generator without the use of an electrolyte, the electrode comprising:

(a) a sheet of conductive foam conformable to body surfaces and having an exterior surface and an opposed interior surface, the interior surface of the sheet of foam providing direct contact with body surfaces;

(b) an electrical terminal means carried by the sheet of conductive foam, the electrical terminal means forming an exterior terminal part of the electrode with which a detachable electrical connection with the electrosurgical generator can be effected; and

(c) an elongated flexible strip secured to the exterior surface of the sheet of conductive foam for attachment around a body member for maintaining the interior surface of the sheet of conductive foam in direct contact with body surfaces, the strip having an interior surface facing the sheet of conductive foam and an opposed exterior surface, at least a portion of the exterior surface of the strip having an adhesive surface, wherein the interior surface of the strip is susceptible to adherence to the adhesive surface.

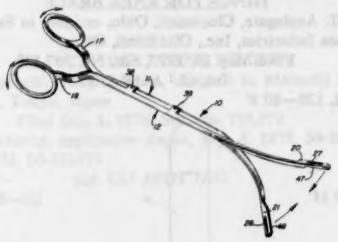
4,088,134

FORCEPS

Rodolpho M. Mazzariello, Buenos Aires, Argentina, assignor to Joseph A. Caprini

Filed Aug. 5, 1976, Ser. No. 711,966
Int. Cl.[2] A61B *17/28*
U.S. Cl. 128—321 **3 Claims**

3. A forceps comprising a pair of members each having a handle portion at one end, a distal tip portion at the other end and a body portion extending linearly from the handle portion to the distal tip portion, said body portions having equal dimensions and one of said body portions having a constricted segment adjacent each end thereof and the other body portion having a channel-forming member adjacent each end thereof, each of said members forming a circular channel having a diameter less than the maximum transverse width of said one body portion and greater than the maximum width of the



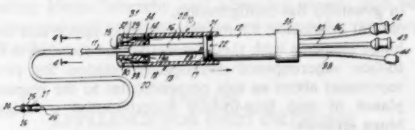
constricted segments, with the center of said channel being spaced from said other body portion a distance slightly greater than one-half said maximum transverse width of said one body portion, the distal tip portions being arcuately offset from the body portions, and said body portions presenting a unitary structure when said constricted segments are received in said channels.

4,088,135

BALLOON CATHETER WITH COAXIAL ACTIVATING SYRINGE

William J. O'Neill, Milltown, N.J., assignor to Victory Engineering Corporation, Springfield, N.J.

Filed Jan. 7, 1977, Ser. No. 757,660
Int. Cl.[2] A61M *25/00*
U.S. Cl. 128—348 **7 Claims**

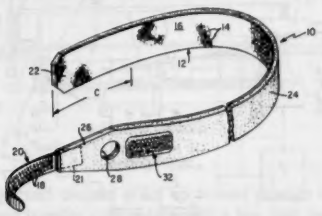


1. A balloon catheter assembly comprising a body, a sleeve slidably carried upon the body, an end wall at the distal end of the sleeve, an elongated hollow guide stem carried by the distal end of the body and extending coaxially therefrom and through the said end wall, an elongated flexible tube coaxially coupled at its proximal end to the hollow stem a plurality of lumens in said tube, sealing means carried within the sleeve to form a fluid tight chamber between the end wall and the distal end of the body, a plurality of conduits secured at one end within the body in communication with the lumens, connectors carried upon the free ends of the conduits, a balloon secured to the flexible tube spaced from the distal end thereof, openings in the wall of the said tube and in the said stem in communication with one of the said lumens to provide a continuous fluid path from the sleeve chamber to the interior of the balloon, and openings in the elongated flexible tube at the distal portion thereof in communication with one or more of the lumens in said tube.

4,088,136
SEPARABLE FASTENER FOR CATHETER TUBES AND THE LIKE

Russell Hasslinger, Wyckoff, and Keldon S. Pickering, Basking Ridge, both of N.J., assignors to American Velcro Inc., Manchester, N.H.

Filed Aug. 26, 1976, Ser. No. 717,944
Int. Cl.[2] A61M *25/02*
U.S. Cl. 128—349 R 21 Claims

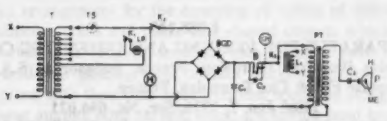


1. A separable fastening device adapted to support an elongated member such as a catheter tube and the like which comprises a flexible strap member including first flexible strap section having first and second end portions and having on one surface portion a plurality of engaging elements upstanding therefrom, a second elongated flexible strap section having on a surface portion opposed to said first surface portion a plurality of mating engaging elements upstanding therefrom, said second strap section being detachably joined at one end portion to the first end portion of said first strap section and extending generally longitudinally therefrom by engagement of the engaging elements of said strap sections, the other end of said second strap section being free, said first flexible strap section defining an opening extending therethrough at a location generally adjacent said first end portion, said opening being dimensioned and spaced sufficiently from said second strap section to receive said free end portion of said second strap section such that at least a portion of said second strap section may be looped at least a portion of said elongated member and positioned within said opening with the engaging elements of said opposed surfaces positioned in engaged face-to-face relation to support said elongated member.

4,088,137
ELECTRON IRRADIATOR

In Su Kim, 54-1, 2-ka, Myong-dong, Chung-ku, Seoul, and Bong Suk Lee, 407-10, Sinlim-dong, Kwanak-ku, Seoul, both of Korea

Filed Oct. 27, 1976, Ser. No. 736,229
Claims priority, application Korea, Oct. 38, 1975, 2311
Int. Cl.[2] A61N *1/00*
U.S. Cl. 128—419 N 4 Claims

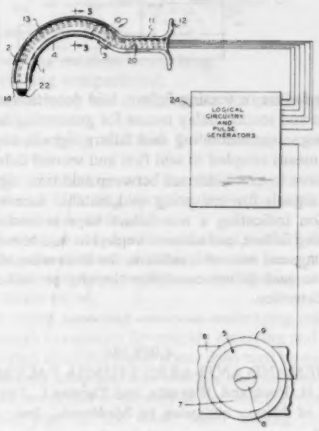


1. An electron irradiator for supplying electrons to the human body comprising an ungrounded electron discharging pole adapted to be brought into proximity to a human body, a source of direct current, a power transformer connected to said D.C. source, an interrupter in the connection between the power transformer and the D.C. source, means for closing and opening the contacts of said interrupter at a predetermined repetition rate, the secondary of said power transformer being connected to the discharge pole, a condenser in the connection between the secondary of the said power transformer and said discharging pole which charges and discharges at the repetition rate of the interrupter, whereby the electron space discharge of the discharging pole, when brought adjacent to the human body, supplies electrons to the body.

4,088,138
CARDIAC RESUSCITATOR AND MONITORING APPARATUS

Archibald W. Diack; Warren S. Welborn, and Robert G. Rullman, all of Portland, Oreg., assignors to Cardiac Resuscitator Corp., Portland, Oreg.

Continuation of Ser. No. 429,745, Jan. 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 253,507, May 15, 1972, abandoned. This application Dec. 29, 1975, Ser. No. 645,074
Int. Cl.[2] A61N *1/36*
U.S. Cl. 128—419 D 20 Claims



1. A cardiac resuscitator apparatus comprising:
an oro-pharyngeal airway for insertion into the pharynx of a patient, said airway having contact means mounted thereon for making electrical contact with tissue within the patient,
second electrode means for external placement on the patient in the chest-abdominal region for making electrical contact with the patient in said region,
circuit means for generating an electrical defibrillating pulse, said circuit means having first and second terminals between which said defibrillating pulse is supplied,
and conductor means respectively coupling said first and second terminals to said contact means and said second electrode means for delivering said defibrillating pulse to the patient through a current pathway in the trunk of the patient between said contact means mounted on said airway and said second electrode means for defibrillating the patient's heart.

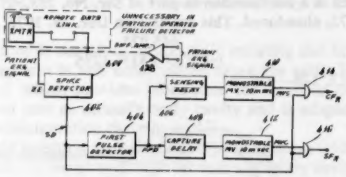
4,088,139
AUTOMATIC DETECTION AND REGISTRATION OF FAILURE CONDITION IN A CARDIAC PACER MONITORING SYSTEM

Albert A. Auerbach, New York, N.Y., assignor to Medalert Corporation, New York, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,953
Int. Cl.[2] A61N *1/36*
U.S. Cl. 128—419 PT 4 Claims

1. An improvement for automatically detecting a condition in a pacer for cardiac pacing and condition monitoring, including the conditions of failure to sense and failure to capture, the combination of a generating means for providing cardiac stimulation signals, sensing means responsive to cardiac stimulus

for providing an electrical signal in accordance with said cardiac condition, comparing means for establishing capture and sense conditions for said electrical signal, and monitoring means providing an output signal for changing the electrical characteristics of the signal provided by such generating means by an amount sufficient to be discernible on an electro-cardiogram in accordance with the conditions of said comparing means, the improvement comprising detection means for monitoring said changed electrical signal from said generating means over a predetermined time period thereby indicating a



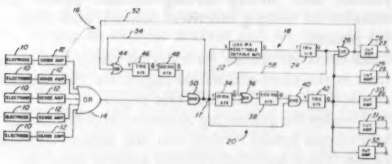
capture failure or sensing failure, said detection means including first and second delay means for generating independently timed signals surrounding said failure signals, bistable means, gating means coupled to said first and second delay means and responsive to a coincidence between said time signals and said failure signals for activating said bistable means from a first condition indicating a non-failure to a second conditioning indicating failure, and means coupled to said bistable means for indicating said second condition, the activation of said bistable means to said failure condition thereby providing said automatic detection.

4,088,140

DEMAND ANTI-ARRHYTHMIA PACEMAKER

Ronald H. Rockland, Wayzata, and Thomas L. Jirak, Plymouth, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Jun. 18, 1976, Ser. No. 697,470
Int. Cl.² A61N *1/36*
U.S. Cl. 128—419 PG **27 Claims**



1. Cardiac electrical stimulation apparatus comprising: means for sensing depolarizations at at least two areas on a heart; first means having output means and responsive to the sensing means for providing cardiac stimulation signals to a plurality of areas on the heart in response to depolarizations occurring above a first predetermined rate; second means having output means responsive to the sensing means for providing cardiac stimulation signals to less than said plurality of areas on the heart in response to depolarizations occurring below a second predetermined rate.

4,088,141

FAULT CIRCUIT FOR STIMULATOR

Bill Howard Niemi, Brooklyn Park, Minn., assignor to Stimulation Technology, Inc., Minneapolis, Minn.

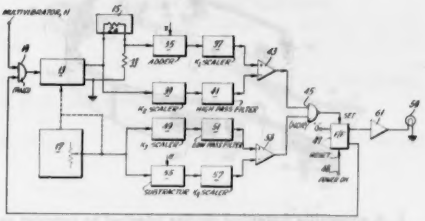
Filed Apr. 27, 1976, Ser. No. 680,634
Int. Cl.² A61N *1/36*
U.S. Cl. 128—421 **8 Claims**

1. An improved fault protection circuit for a medical stimulator, said stimulator having a power on/off switch and triggered output pulse generating circuit with an amplitude adjustment, said output pulse circuit being connected to an electrode load comprising:

means for monitoring the output load impedance connected to said pulse generating circuit;

means connected to said impedance monitoring means for disabling said generating circuitry upon the detection of an excessive impedance value; and

means for monitoring the rate of change in the magnitude of the output current from said pulse generating circuit, said



output current monitoring means being connected to operate said disabling means upon the detection of an excessive rate of change in said output current magnitude, wherein said impedance monitoring means includes an impedance comparator connected to the output of said pulse generating circuitry and wherein said pulse generator disabling means includes a gate in the input trigger to said pulse generating circuitry, said gate being conditioned by a signal from said impedance comparator.

4,088,142

CIGARETTES

Henry George Horsewell, Totton, and Robin Arthur Crellin, Romsey, both of England, assignors to British American Tobacco Co., Ltd., London, England

Filed Sep. 30, 1976, Ser. No. 728,408
Claims priority, application United Kingdom, Oct. 28, 1975, 44432/75
Int. Cl.² A24D *1/02*; A24B *15/00*
U.S. Cl. 131—9 **4 Claims**

1. A cigarette comprising;

a rod of tobacco wrapped in a material consisting of a very highly porous paper, with an air porosity within the range from 2,450 to 20,000$cm^3min^{-1}10cm^{-2}10cmWG^{-1}$ produced from a base paper having a tensile breaking strength of not less than 85 g per mm width of paper by perforation of the paper wherein upon combustion the effect of said material is to produce a low ratio of carbon monoxide to nicotine content in the smoke stream.

4,088,143

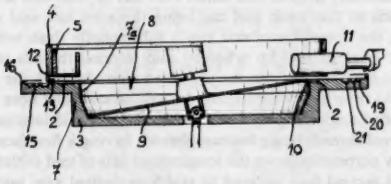
APPARATUS FOR FEEDING AND ORIENTING COINS

Nicolas Bezsilko, Tourcoing, France, assignor to S.A. Vandeputte Fils & Cie, Tourcoing, France

Filed Jun. 7, 1976, Ser. No. 694,021
Claims priority, application France, Jul. 2, 1975, 75 21316
Int. Cl.² G07D *9/00*
U.S. Cl. 133—1 R **6 Claims**

1. Apparatus for feeding and orienting pieces of money, coins and similar objects in a sorting machine comprising; a rotating dish, an axis of rotation for said dish, an upper face for said dish, a cavity at the center of said dish containing the pieces to be fed and oriented, a peripherable wall for said cavity inwardly of said upper face, means for bringing the pieces to be oriented flat on said upper face of said dish at a transfer point, a fixed crown disposed above said upper face of said dish, an internal face for said crown against which the pieces engage by centrifugal force resulting from rotation of said dish, a circular path formed by a part of said upper surface

of said dish between said peripherable wall of said cavity and the internal face of said crown, a passage in said crown situated downstream of said transfer point at an exit point so that the pieces which no longer bear against said face of said crown are ejected to a following operating position, the improvement comprising said track having an increasing width beginning in



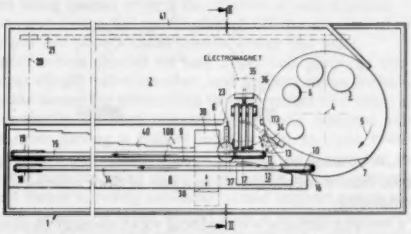
an area near said transfer point up to said passage such that adjacent said transfer point said width is less than one-half of the diameter of the largest of the pieces to be oriented and is not greater than one and a half times the diameter of the smallest of the pieces and adjacent said passage said width is sufficient to provide total support for the largest of said pieces to be oriented.

4,088,144

ARRANGEMENT FOR COUNTING DIFFERENT-DENOMINATION COINS AND SIMILAR DISK-SHAPED OBJECTS

Gert Zimmermann, Berlin, Germany, assignor to F. Zimmermann & Co., Berlin, Germany

Filed Sep. 29, 1976, Ser. No. 727,871
Claims priority, application Germany, Oct. 22, 1975, 2547685
Int. Cl.² G07D *3/00*
U.S. Cl. 133—3 F **15 Claims**



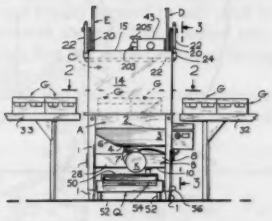
1. An arrangement for the counting of values of different-denomination coins and other disk-shaped objects which are transported in an irregular sequence comprising: a guide track with rectilinear guiding edge on said track, said coins being transported with their rims in an irregular sequence along said rectilinear guiding edge on said track; a scanning head located at the start of the rectilinear guiding edge for identifying a coin and comprising a plurality of photoconductor strands having free ends located at varying distances from said guiding edge; a photocell connected to each of the other ends of said photoconductor strands; a light-beam element illuminating the free ends of said photoconductor strands; said photoconductor strands and said light-beam elements being separated by a scanning gap for passage of the coins; stop means ahead of said scanning head and comprising: at least one pivoted leaf spring, an electromagnet for controlling the positioning of said leaf spring, and a coating on the free end of said leaf spring for holding the coins to said guide track.

4,088,145

TANDEM RACK DISHWASHING MACHINE

Tore H. Noren, 3200 Lakeville Hwy., Petaluma, Calif. 94952

Filed Oct. 18, 1976, Ser. No. 733,387
Int. Cl.² B08B *3/02*
U.S. Cl. 134—104 **3 Claims**



1. A dishwashing machine comprising:
(a) a dishwashing compartment;
(b) a tank underlying said compartment for receiving water therefrom;
(c) a sump underlying said tank for receiving water therefrom;
(d) means for circulating water from said sump to said compartment and including spraying arms for washing the dishes in said compartment;
(e) a waste water drain pipe for said sump and a drain valve controlling the outflow of water from the sump and tank and into said drain pipe with means for opening and closing said drain valve;
(f) a waste water receiving reservoir underlying said sump large enough in capacity for quickly receiving and temporarily storing all of the waste water delivered by said drain pipe from said sump and tank and into said reservoir when said valve is opened at the end of the washing operation;
(g) an outlet pipe for the waste water leading from said reservoir to a sewer for delivering the waste water from said reservoir into the sewer; and
(h) means for delivering rinse water into said tank and then for closing said drain valve, the rinse water being delivered into said tank while the waste water flows from said reservoir into said outlet pipe to the sewer.

4,088,146

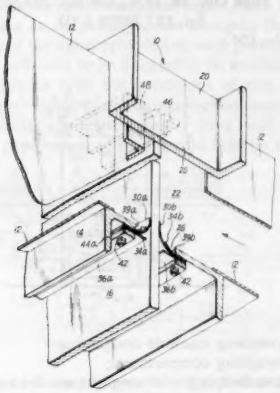
APPARATUS AND METHOD FOR SEALING DAMPERS

Donald K. Hagar, Allentown, Pa.

Filed Aug. 2, 1976, Ser. No. 710,379
Int. Cl.² F16K *3/312, 25/00*
U.S. Cl. 137—1 **28 Claims**

22. A method for sealing a flow control apparatus, the apparatus having: a body; a fluid passageway therethrough; a closure member for sliding movement between a closed position wherein the closure member extends into the fluid passageway to restrict the flow of fluid therethrough and an open position wherein the closure member is withdrawn completely from the fluid passageway; an aperture in said body through which said closure member moves between said open and closed positions; opposed, cooperating sealing strips mounted in said body so as to overlap each other in sealing engagement when said closure member is completely withdrawn from said fluid passageway and so as to resilient, sealingly engage said closure member by bending of said sealing strips into a concave bending condition with respect to the interior of said passageway when said closure member is inserted through said aperture into said passageway; the method comprising the steps of:
(a) withdrawing said closure member from said fluid passageway toward said open position;
(b) allowing said sealing strips to undergo a buckling action changing said sealing strips from said concave bending condition with respect to the interior of said passageway

to a convex bending condition with respect thereto by way of the withdrawal movement of said closure member, and



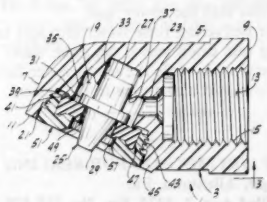
(c) applying to said sealing strips a resistance force which restrains said sealing strips against movement due to a pressure differential between the interior and exterior of said fluid passageway such as would break the seal provided by said sealing strips.

4,088,147

AIR CHUCK

Joseph L. Krechel, Chesterfield, and Michael J. Purvis, Ladue, both of Mo., assignors to Control Devices, Incorported, St. Louis, Mo.

Filed Jul. 9, 1976, Ser. No. 704,066
Int. Cl.[2] F16K *15/20*
U.S. Cl. 137—223 **1 Claim**



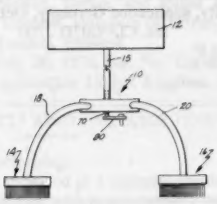
1. In an air chuck molded of synthetic resin material comprising a body having a main portion and a head portion, said main portion having an end face constituting a back face, said head portion having an end face constituting a front face, an axial bore constituting an inlet bore extending into said main portion from said back face, one end of said inlet bore being adapted for connection to an air line or the like and constituting the sole air inlet for said air chuck, an axial bore constituting an outlet bore extending into said head portion from said front face, a portion of said outlet bore constituting a first recess therein, a valve member received in said first recess, another portion of said outlet bore constituting a second recess coaxial with said first recess, a gasket received in said second recess, and a cap securable in said second recess for holding said valve member and said gasket in assembled relation, a passage in said body providing communication between said inlet bore and said first recess of said outlet bore, said gasket and said cap each having an opening therethrough for the flow of air from said air chuck, said valve member being movable in said first recess from a closed position in which it sealingly engages said gasket for blocking the flow of air from said air chuck and an open position in which it is clear of said gasket thereby permitting air to flow from said passage, past said valve member, and through said openings in said gasket and said cap, these last-said openings constituting the sole air outlet for said air chuck, said cap having external threads thereon and said outlet bore being internally threaded for reception of said cap threads; wherein the improvement comprises said internal threads in said outlet bore being recessed into the outlet bore and a portion of said head portion constituting a lip extending continuously around said outlet bore out beyond said internal threads so that upon said cap being threaded into said outlet bore, the outer face of said cap is substantially flush with the outer edge of said lip whereby said internal threads in said outlet bore and the cap are protected from damage, the plane of said front face intersecting the axis of said inlet bore at an included angle ranging between 20° and 30°, said internal and external threads being buttress threads having a first face generally perpendicular to the longitudinal axis of said outlet bore and a second face inclined to said longitudinal axis, said first face on said internal threads facing inwardly of said outlet bore, said first face of said external threads interengaging said first face of said internal threads whereby said first faces resist internal pressure forces acting on said cap and insure that said cap remains sealed to said body even if said body expands radially due to said internal pressure.

4,088,148

FLOOR SCRUBBER SOLUTION VALVE

Dale E. Lowder, North Muskegon, Mich., assignor to Clarke-Gravely Corporation, Muskegon, Mich.

Filed Oct. 26, 1976, Ser. No. 735,840
Int. Cl.[2] F16K *11/00*; A47L *11/03*
U.S. Cl. 137—625.47 **25 Claims**



1. A solution valve for metering substantially equal rates of liquid from a supply source to a pair of floor treating elements comprising;

a housing defining a cylindrical valve element chamber and having an inlet port and a pair of outlet ports; and

a valve element rotatably mounted in said chamber for rotation from a closed position to an open position, said valve element including:

means defining an inlet passage alignable with said housing inlet port as said valve element is rotated;

means defining a divider passage intersecting said inlet passage, the ends of said divider passage each having an effective flow area opening to said outlet ports upon rotation of said valve element;

first flow initiating means at one end of said divider passage for initiating flow at one of said outlet ports; and

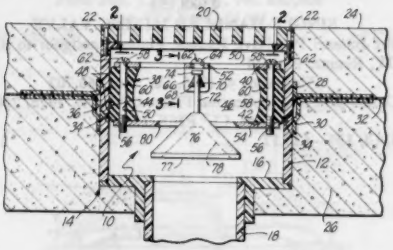
second flow initiating means at the other end of said divider passage for initiating flow at the other one of said outlet ports simultaneously with said first flow initiating means, each of said first and second flow initiating means opening into said divider passage and varying the effective flow area of the ends of said divider passage for maintaining substantially equal flow rates at said outlet ports during rotation of said valve element.

4,088,149

CHECK VALVE STRUCTURE FOR USE IN DRAINS

Duane D. Logsdon, 1708 Calavera Dr., Fullerton, Calif. 92631

Filed May 20, 1976, Ser. No. 688,139
Int. Cl. F16k *31/22, 33/00*
U.S. Cl. 137—433 1 Claim



1. A check valve structure which comprises:

an annular elastomeric member having upper and lower ends, said member in an uncompressed condition having a cylindrical peripheral wall and a plurality of sealing rings extending from said wall and extending completely around said member, said sealing rings being spaced from one another, said member in an uncompressed condition being capable of fitting within the interior of a drain so as to extend across the interior of a drain with said sealing rings engaging the interior of the drain so as to hold said structure in place,

a rigid upper annular end plate located against the upper end of said elastomeric member,

a rigid lower annular end plate located against the lower end of said elastomeric member,

fasteners extending between said end plates for moving said end plates toward one another in order to apply compression to said elastomeric member in order to cause expansion of the exterior of said elastomeric member into sealing engagement with the interior of the drain, said fasteners being spaced around the interior of said member,

valve seat means for use in closing off the interior of said lower end plate located on said lower end plate,

support means located on said upper end plate for use in supporting a valve member, said support means including guide means for controlling the movement of a stem, and

an upwardly directed conical, elastomeric buoyant valve member having a hollow interior and an open bottom extending across the lower end of said valve member, said valve member being capable of seating against said valve seat means movably mounted on said support means so as to be capable of being moved from a normally open position spaced from said valve seat means to a closed position in contact with said valve seat means, said valve member including a stem extending therefrom through said guide means,

said stem having an enlarged head normally engaging said support means so as to hold said valve member with respect to said support means and said valve seat.

4,088,150

VALVE FOR THE AUTOMATIC FLOW CONTROL OF A FLUID IN A CONDITIONING SYSTEM

Angelo Serratto, C. So Indipendenza 5, Milan, Italy

Filed Aug. 3, 1976, Ser. No. 711,275
Claims priority, application Italy, Aug. 5, 1975, 26146 A/75
Int. Cl.[2] F16K *31/12*
U.S. Cl. 137—499 9 Claims

1. A valve for automatically controlling air flow in a conduit such that the air flow remains substantially constant over a wide range of air pressure variations in the conduit, said valve comprising:

a valve body adapted to be connected to said conduit such that air flowing through said conduit also flows through the valve body;

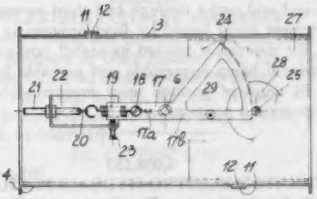
a shaft having a longitudinal axis and extending entirely through said valve body transversely of said air flow;

means securing said shaft to said valve body for rotational motion about said longitudinal axis;

a tab member extending radially from said shaft within said valve body and fixedly secured to said shaft so as to be rotatable therewith about said longitudinal axis;

a rigid rod having first and second ends and having a sector gear at said first end;

means for securing said rod, at a location intermediate said first and second ends, to said shaft along the outside of said



valve body such that said rod extends perpendicular to said longitudinal axis and is rotatable thereabout with said shaft, and such that longitudinal movement of said rod is precluded;

spring means secured between said valve body and a location on said rod which is closer than said shaft to said second end, for biasing said rod toward said second end;

a pinion rotatably secured to the outside said valve body such that it meshes with said sector gear;

a flywheel mounted outside said valve body about said pinion to be rotatable therewith; and

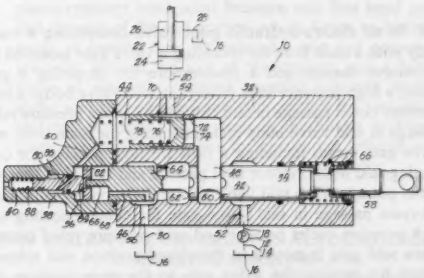
adjustable means for rotatably positioning said rod, and thereby said tab, an initial position.

4,088,151

CYLINDER LOCKING APPARATUS

Joseph Anthony Schurger, Wooster, Ohio, assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 26, 1976, Ser. No. 690,136
Int. Cl.[2] F15B *11/08, 13/042*
U.S. Cl. 137—596.2 3 Claims



1. A flow control mechanism comprising a body defining a bore and an inlet, an outlet, and a first passage communicating with said bore, said body further defining a chamber communicating with said first passage, a second passage communicating said chamber with said bore, and a work port, said mechanism further comprising a spool slidable in said bore between a first position establishing fluid communication between said inlet and said first passage through said bore and a second position establishing fluid communication between said first passage

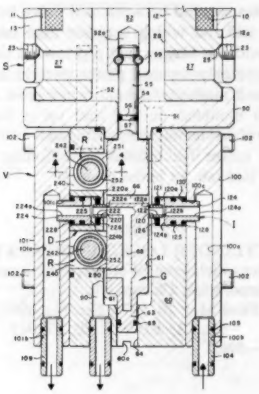
and said outlet through said bore, said spool defining a third passage communicating said bore with said outlet, a check valve, said check valve having a check valve element movable between an open position establishing fluid communication between said first passage and said work port and a closed position blocking fluid communication therebetween, said check valve defining flow restricting means communicating said chamber with said work port, said check valve element being biased by fluid pressure in said chamber for movement toward its closed position, and a pilot valve, said pilot valve having a pilot valve seat in said bore, and a pilot valve element slidable in said bore between a seated position isolating said second passage from said third passage and an unseated position establishing fluid communication between said second passage and said outlet through said third passage, said pilot valve element being biased by fluid pressure in said second passage for movement toward its seated position, said pilot valve element being engageable and movable by said spool toward its unseated position upon movement of said spool toward its second position.

4,088,152

LOW FRICTION ELECTRO-HYDRAULIC PILOT VALVE

Benton F. Baugh, Houston, Tex., assignor to Vetco Offshore Industries, Inc.

Filed Apr. 21, 1976, Ser. No. 678,994
Int. Cl.[2] F16K *11/06*
U.S. Cl. 137—625.65 **1 Claim**



1. In an electro-hydraulic pilot valve comprising a valve body with a main bore for receiving a valve gate mounted for movement therein and a counterbore for receiving a gate guide, a high pressure inlet passage in said valve body; a high pressure outlet passage in said valve body, and a pressure relief passage in said valve body communicating the main bore, said valve gate means including a flow through passage for connecting said high pressure inlet passage and said high pressure outlet passage when said valve gate is in the open position and a bypass passage in said valve gate for communicating said high pressure outlet passage and said pressure relief passage when said gate is moved to the closed position and solenoid means for moving the valve gate to the open position, the improvement comprising:

a spaced pair of rollers positioned to engage the side of said valve gate adjacent said high pressure outlet, single shear seals in said valve body adjacent said high pressure inlet passage, and said high pressure outlet passage for sealing said flow through passage when said valve gate is in the open position and said bypass passage when said valve gate is in the closed position; and

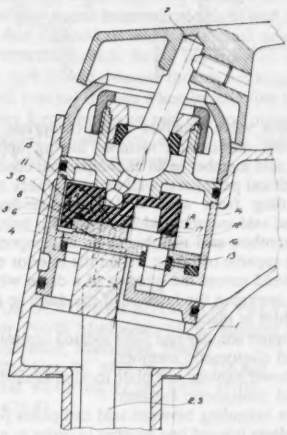
a fluid release passage communicating the counterbore for discharging fluid leaking passed the gate guide into the counterbore.

4,088,153

SINGLE-HANDLED MIXING VALVE

Erkki Jalmari Paasikivi, Rauma, Finland, assignor to K. Oras OY, Rauma, Finland

Filed Mar. 4, 1976, Ser. No. 663,702
Claims priority, application Finland, Mar. 6, 1975, 750655
Int. Cl.[2] F16K *19/00*
U.S. Cl. 137—625.17 **1 Claim**



1. A single-handled mixing valve, which comprises

a valve body;

inlet pipes for cold and hot water respectively;

a first fixed ceramic plate having inlet openings connected to said inlet pipes an a water discharge opening for the controlled water amount;

a second movable ceramic plate positioned in flat relationship to said first fixed ceramic plate and movable in relation thereto;

a channel member sealingly and rigidly fixed to said second ceramic plate and forming together with the second ceramic plate non-communicating channels for cold and hot water so that the cold and hot water are not mixed with each other before reaching the discharge opening in the first fixed plate; and

an operating lever pivotally connected to said channel member for movement of the channel member together with the second ceramic plate in order to control the total amount and the mixing ratio of cold and hot water;

said non-communicating channels, as seen in the crosssection of the channel member, comprising two channels which curve towards each other symmetrically and are closest to each other at a point adjacent to the discharge opening of the fixed ceramic plate;

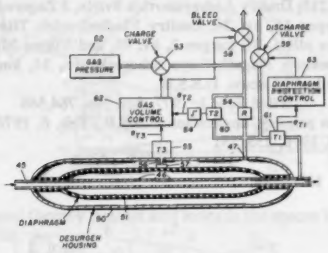
the movable ceramic plate comprising two inlets which correspond to the inlets in the fixed ceramic plate and two discharge openings situated close to each other, separated by a narrow isthmus, which are symmetrically disposed in regard to the discharge opening in the fixed ceramic plate;

the channel member attached to the movable ceramic plate being of plastic material and being sealed in relation to said movable ceramic plate by means of a sealing ring surrounding the said channel parts.

4,088,154
AUTOMATICALLY CONTROLLED DESURGING SYSTEM

Bobbie J. Patton, Dallas, and John W. Harrell, Duncanville, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 7, 1976, Ser. No. 693,680
Int. Cl.² F16L *55/04*
U.S. Cl. 138—30 **14 Claims**



1. In a gas-loaded hydraulic desurger of the type having a flexible diaphragm dividing said desurger into a first chamber pressurized from a gas supply and a second chamber through which flowing fluid is passed, the method of controlling the gas pressure in said first chamber comprising the steps of:

(a) measuring the gas volume within said first chamber,

(b) comparing the measured gas volume with predetermined upper and lower limits for the gas volume,

(c) charging the gas pressure in said first chamber should the measured gas volume fall below said lower limit,

(d) discharging the gas pressure in said first chamber should the measured gas volume exceed said upper limit,

(e) measuring the gas flow rate into and out of said first chamber during charging and discharging of said gas pressure,

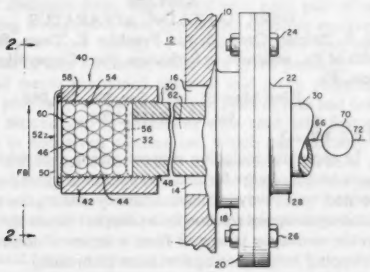
(f) determining from said measured gas flow rate the amount of change in said measured gas volume due to the charging or discharging of said gas pressure, and

(g) terminating the charging or discharging of said gas pressure when the change in said measured gas volume reaches a first level.

4,088,155
NON-PLUGGING PRESSURE TAP

Joseph P. Echtler, Pittsburgh, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 17, 1973, Ser. No. 407,389
Int. Cl.² F15D *1/02*
U.S. Cl. 138—41 **5 Claims**

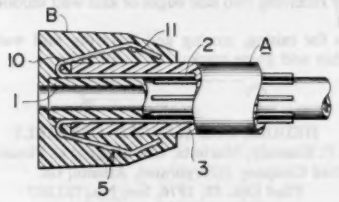


1. A tap for a pressure determining means, said tap being adapted for use in the path of a solid-gas phase process flow contained in a vessel therefor, comprising a casing having a conduit providing a passage therethrough between opposite end openings thereof, one of said openings being adapted to be disposed in said path, and the other of said openings having connected thereto a fluid flow communicating means adapted to extend between said casing and said pressure determining means outside said vessel, a plurality of spaced bars attached to said casing over said one end opening thereof, and a perforated device affixed within said casing so as to screen fully said passage thereof, and a multiplicity of substantially uniform rounded elements enclosed within said passage between said spaced bars and said perforated device.

4,088,156
FLEXIBLE CONDUIT ASSEMBLY

Shinsuke Kubo, Osaka, and Hiroyuki Kuzunishi, Nagoya, both of Japan, assignors to Oiles Industry Co., Ltd., Tokyo and Chuo Spring Co., Ltd., Nagoya, both of, Japan

Filed Aug. 2, 1976, Ser. No. 710,804
Claims priority, application Japan, May 7, 1976, 51-51339; May 7, 1976, 51-56651[U]
Int. Cl.² F16C *1/10*
U.S. Cl. 138—109 **1 Claim**



1. In a flexible conduit assembly including an elongated flexible conduit having an inner tube made of synthetic resinous material, a plurality of load-bearing wires wrapped helically about said inner tube on a long lead, a tubular outer casing made of synthetic resinous material enclosing said wires and said inner tube, and a flexible motion-transmitting wire core element supported within and extending through the bore of said inner tube; the improvement comprising:

the end portions of at least some of said wires being reversely bent wherein each of said reversely bent portions includes a first plasto-resistant bend point adjacent the end of the outer casing in which the end portion is bent through an angle of between 90° and 180° and a second plasto-resistant bend point between said first bend point and the end of the end portion which forms an included angle of greater than 90° whereby said end converges inwardly toward the axis of the conduit, and a holder made of synthetic resinous material injection molded about said end portions and said conduit for embedding said end portions of the wires in the holder to form a plasto-resistant end anchor for preventing relative axial movement between said conduit and said holder.

4,088,157
HOOD SYSTEM FOR COVERING AN AUTOMATICALLY OPERATING MACHINE

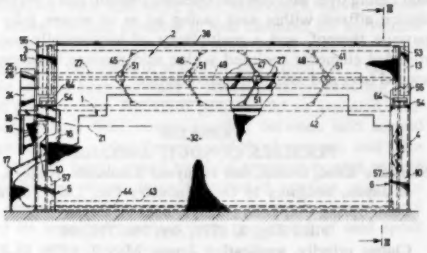
Yian Nian Chen; Marcel Brugger, both of Winterthur; Friedrich Maurer, Biel, and Alfred Meyer, Winterthur, all of Switzerland, assignors to Sulzer Brothers Ltd., Winterthur, Switzerland

Filed Jun. 8, 1976, Ser. No. 693,919
Claims priority, application Switzerland, Jun. 12, 1975, 7609/75
Int. Cl.² D03D *49/00*; E04B *1/84*; G10K *11/00*
U.S. Cl. 139—1 R **12 Claims**

1. A hood system for covering an automatically operating machine comprising

a pair of fixed end frames;

a cover for surrounding the machine in the form of a tunnel, said cover having at least one sidewall section of sound insulating material movably mounted relative to said end frames between an operating position with a bottom edge of said wall section near ground level and a stored position



with said bottom edge elevated above ground level to provide access to the machine;

a pair of rigid upright guide tracks on said end frames slidably receiving two side edges of said wall section therein; and

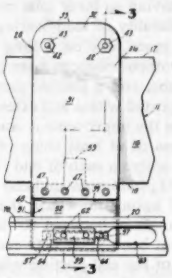
means for raising, storing and lowering said wall section within said guide tracks.

4,088,158

HEDDLE ROD HANGER ASSEMBLY

William P. Kennedy, Marietta, Ga., assignor to Pioneer Heddle and Reed Company Incorporated, Atlanta, Ga.

Filed Oct. 15, 1976, Ser. No. 732,807
Int. Cl.² D03C *9/06*
U.S. Cl. 139—92 **5 Claims**



1. A heddle rod hanger assembly for mounting on a rectangular shaped heddle frame rail having horizontal top and bottom edges and vertical side walls, comprising:

(a) a substantially rectangular shaped first section having first front and first rear walls and first recessed area defined by said first rear wall;

(b) a substantially rectangular shaped second section having second front and second rear walls, a second recessed area defined by said second rear wall for registering with said first recessed area, said first and second sections being mateable for engagement with each other so as to encompass said rail within a cavity formed by said recessed areas, said second section being of greater length than said first section so as to form an extended portion;

(c) each of said sections being of molded synthetic plastic material;

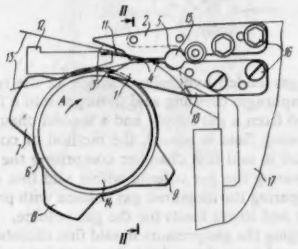
(d) mounting means for mounting a heddle rod on said hanger, said mounting means comprising a metal plate carried in a vertically disposed position against said extended portion, and an element extending from an inner portion of said plate for supporting said rod in spaced relationship to said rail, the upper portion of said plate being received within said cavity and said second section.

4,088,159

LOOM DEVICE FOR HOLDING WEFT THREAD ENDS

Jury Ivanovich Komarov, ulitsa Miklukho-Maklaya, 29, korpus 1, kv. 215; Dmitry Andreyanovich Svirin, 3 Zagorodny proezd, 7, korpus 16, kv. 24; Dmitry Vladimirovich Titov, 13 Parkovaya ulitsa, 27, korpus 2, kv. 49, and Viktor Mikhailovich Lukhmanov, Nagatinskaya naberezhnaya, 14, korpus 4, kv. 161, all of Moscow, U.S.S.R.

Filed Feb. 1, 1977, Ser. No. 764,540
Claims priority, application U.S.S.R., Feb. 6, 1976, 2322827; Mar. 23, 1976, 2331151
Int. Cl.² D03D *47/26*
U.S. Cl. 139—194 **2 Claims**



1. A device for holding ends of a weft thread on a loom having a rotary shaft carrying beat-up elements, comprising: two groups of shaped plates arranged in planes perpendicular to said rotary shaft opposite one another, installed on shafts adjacent each selvage at the fell of the cloth, each said plate having a notch and a projection, said plates of at least one of said groups always occupying gaps between the beat-up elements of the loom; said plates of one group being arranged closely adjacent the plates of the other group so that their projections are also arranged closely adjacent one another forming there between a gap of less width than the thickness of the weft thread wherein the weft thread frictionally engages the projections of the plates, as a result of which the thread end is frictionally held at the selvages of the cloth.

4,088,160

WIRE HANDLING APPARATUS

Jack S. Balmat, Orefield, and Franklin E. Timm, Bethlehem, both of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

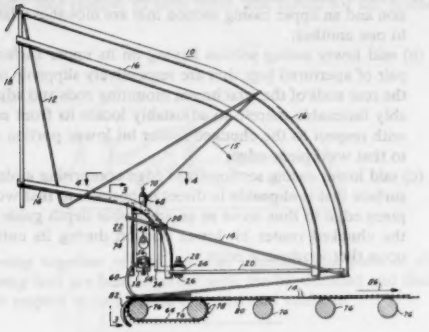
Filed May 10, 1977, Ser. No. 795,584
Int. Cl.² B21F *3/08*
U.S. Cl. 140—2 **7 Claims**

1. In apparatus including support means over which a continuous length of wire formed into a series of loops pass and are deposited on conveyor means whereby due to the motion of the conveyor means relative to the support means the loops fall onto the conveyor means to form a series of non-concentric overlapping loops, the improvement comprising:

(a) said conveyor means includes a conveyor belt positioned below said support means and having spaced pins extending therefrom for engaging said loops to control the spacing between said loops on said conveyor means, and

(b) guide means mounted on the lower end of said support

means to engage an upper surface of said loops on said conveyor means to limit the upward movement of said



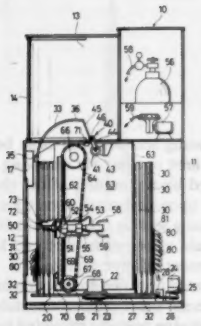
loops and thereby contain said loops in the spaces between said pins.

4,088,161

BALLOON VENDING MACHINE

Kikuji Ikemoto, 100-27 Shin-narita, Hirono-cho, Uji-shi, Kyoto-fu, Japan

Filed Nov. 2, 1976, Ser. No. 738,230
Claims priority, application Japan, Nov. 28, 1975, 50-143227
Int. Cl.[2] B65B *43/14*
U.S. Cl. 141—167 **8 Claims**



1. A balloon vending machine comprising:

a rotatable turntable and means for rotating said turntable about a central axis;

a plurality of pairs of rails projecting from said turntable at equal distances from said central axis, each pair of rails defining a respective first gap which slideably receives a plurality of neck fittings of unfilled balloons and, upon rotation of said turntable, stops at a given position;

fixed rail means positioned adjacent said given position in close proximity to said plurality of pairs of rails and defining a second gap in alignment with each said first gap when in said given position and which can slideably receive individual neck fittings of balloons, said fixed rail means having an end portion remote from said first gaps;

gas supplying means positioned radially inwardly from said plurality of pairs of rails, said gas supplying means including nozzle means positioned for radial movement toward each said first gap when in said given position for entering an individual neck fitting of a balloon;

means coupled to said gas supplying means for selectively moving said nozzle means into a neck fitting of a balloon;

means coupled to said gas supplying means for moving said nozzle means parallel to said plurality of pairs of rails and said fixed rail means to a filling station thus moving said neck fitting with a balloon attached from a pair of rails at said given position onto said fixed rail means to said filling station;

means responsive to arrival of a balloon in said filling station for triggering said nozzle means to inflate that balloon; and

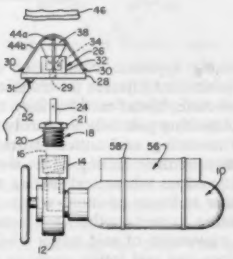
pulling means coupled to said end portion of said fixed rail means for pulling said end portion to aid in separating into two parts the neck fitting of that balloon which has been inflated.

4,088,162

INFLATABLE SIGNAL DEVICE

Nicholas V. Rossi, 21 Greeley St., Sayville, N.Y. 11782, assignor to Nicholas V. Rossi, Sayville, N.Y.; Pasquale Sciafani; Orlando N. Rossi, both ofWatertown, Mass.; Victor H. Rossi, Medford, Mass. and Richard P. Rossi, Arlington, Mass.

Filed May 28, 1976, Ser. No. 690,949
Int. Cl.[2] B65B *39/00*
U.S. Cl. 141—353 **3 Claims**



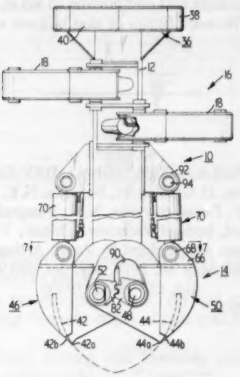
1. In a signal device comprising (1) an inflatable balloon, (2) a balloon adaptor including a collar and a hollow extension attached to said collar and having a seat formed at one end thereof and an opening at a second end thereof, a valve member sized to fit on said seat, and bias means for urging said valve member against said seat in an air-tight relationship, and (3) a supply adaptor for directing a stream of gas into said balloon via said balloon adaptor, said supply adaptor including a flange and a hollow stem having at least one port on the side thereof, said hollow stem having an end section which is dimensioned so that it may be inserted into said hollow extension via said opening, said balloon adaptor being securable in the neck of said balloon so that said valve member and the said seat on said hollow extension extend into said balloon, the improvement comprising (1) a slot at one end of said valve member which is sized to receive said end section of said stem, (2) said hollow stem of said supply adaptor being long enough so that when said stem is inserted into the said hollow extension of said balloon adaptor via said opening, the end section of said stem may be disposed to engage said valve member so as to lift the valve member from said seat against the bias of said resilient means and thereby allow said port to communicate with the interior of said balloon, whereby gas will be abie to flow from said supply adaptor into said balloon via said hollow extension, (3) said valve member being adapted to move clear of said seat while said end section of said stem is still received by said slot, whereby said bias means and said end section of said stem cooperate to prevent said valve member from reorienting itself with respect to said seat, and (4) said flange being disposed on said supply adaptor so as to limit further penetration of said stem into said hollow extension after said stem has lifted said valve member from said slot.

4,088,163

TREE SHEARING DEVICE

Lucien Levesque, 3100 Carling Ave., Apt. 1106, Ottawa, Ontario, Canada

Filed Aug. 6, 1976, Ser. No. 712,218
Claims priority, application Canada, Aug. 6, 1975, 232902
Int. Cl.[2] A01G *23/08*
U.S. Cl. 144—34 E **10 Claims**



1. Tree shearing apparatus comprising: a support means adapted to be positioned adjacent the trunk of a standing tree, first and second cutter blades each having a cutting edge, said cutter blades projecting generally forwardly from the support means, means mounting said cutter blades to said support means for motion of their cutting edges along curved paths from elevated positions where said cutting edges are spaced from one another to lower positions where said edges are in close juxtaposition to one another, and actuating means for effecting said movement of said cutter blades between said elevated positions and said lower positions whereby to perform a tree-trunk shearing operation, characterized in that said means mounting said cutter blades includes a pair of shaft means defining a pivot axis for each said blade, said shaft means being laterally spaced apart and each said cutter blade being mounted to a respective one of the shaft means such that radial lines drawn from said pivot axes to their respectively associated cutting edges intersect one another as said cutting edges are moved between their elevated positions and their lower positions.

4,088,164

PORTABLE ROUTER ATTACHMENT

Wilfred M. McCord, Jr., Louisville, Ky., assignor to Vermont American Corporation, Louisville, Ky.

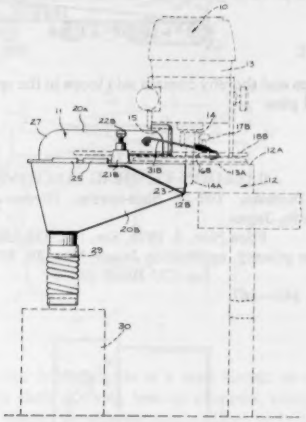
Filed Jun. 2, 1977, Ser. No. 802,826
Int. Cl.[2] B27G *21/00*
U.S. Cl. 144—252 R **3 Claims**

1. For use with a portable router of a type including a housing which contains rotatable router bit chuck means and has, beneath those chuck means and arranged generally perpendicular to the rotational axis thereof, a lower surface that, in part, can be rested atop a surface of a workpiece to align a chucked router bit generally perpendicular to that workpiece surface and generally parallel to an edge of that workpiece surface which is to be cut upon by the lower portion of the router bit and which housing is provided with a workpiece chip discharge opening between its lower surface and the chuck means that will then open upwardly and rearwardly from that workpiece edge and has on opposite sides of that opening a pair of sockets into which there can be respectively received and fastened a pair of attachment mounting rods such that each of those rods will be arranged generally perpendicular to that workpiece edge and have a front end which extends toward that workpiece edge and a rear end that extends away from that workpiece edge, a combination workpiece chip collector and adjustable depth edge guide attachment, comprising:

(a) hollow casing means which include a lower casing section and an upper casing section that are movable relative to one another,

(b) said lower casing section having on its upper surface a pair of apertured lugs that are respectively slippable over the rear ends of the attachment mounting rods and adjustably fastenable thereto to adjustably locate its front edge with respect to the chucked router bit lower portion and to that workpiece edge,

(c) said lower casing section front edge comprising a planar surface that is alignable in direct opposition to that workpiece edge to thus serve as an adjustable depth guide for the chucked router bit lower portion during its cutting upon that workpiece edge,



(d) said lower casing section front edge being further provided with an inlet opening for receiving workpiece chips thus discharged by the cutting of the chucked router bit lower portion upon that workpiece edge,

(e) said upper casing section being mountable in track means provided on said upper surface of said lower casing section for movement relative thereto,

(f) said thus mounted upper casing section having an opening in the front thereof that is fluid-connectable into the workpiece chip discharge opening provided in the router housing and having a rear end that is adjustably alignable over a workpiece chip inlet opening that is provided in the rear portion of said upper surface of said lower casing section, and

(g) said lower casing section being provided with an outlet opening for discharging all of the workpiece chips entering said casing means that can be connected to a vacuum source.

4,088,165

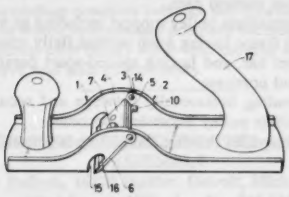
PLANING TOOL

Allan V. T. Andersson, Kjellbergsgatan 6, S-411 ss Göteborg, Sweden

Filed Oct. 26, 1976, Ser. No. 735,492
Int. Cl.[2] B27G *17/02*
U.S. Cl. 145—5 R **10 Claims**

1. Planing tool, preferably for use with one time bits, comprising a front part and a rear part, said front part having a rearwardly facing surface and said rear part having a forwardly facing surface, said parts being pivotally connected with each other so that said surfaces are pivotable towards and away from each other, said surfaces having an inclination in the direction of forward push of the planing tool which substantially corresponds to the desired inclination of a bit to be

used with said tool, and said surfaces further having means for fixing a bit, said surfaces, and consequently said parts of the planing tool relative to each other, and means for the mutual



pressing together of said surfaces whereby said parts of the planing tool are held together with the bit clamped and fixed with respect to its position between said surfaces.

4,088,166

MOLDED COLLAPSIBLE SOLUTION CONTAINER HAVING GUSSET PORTIONS

Joe A. Miller, Lake Zurich, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Division of Ser. No. 526,093, Nov. 21, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,058

Int. Cl.² B65D *1/02*

U.S. Cl. 150—.5 **14 Claims**

1. A molded collapsible solution container, which container defines a body portion having an integral neck portion and generally oval, relatively stiff shoulder portion at one end thereof, and is sealed at its end opposite said one end, the improvement comprising: said body portion defining, in its original, unstressed configuration, a generally oval, transverse cross-section adjacent said neck and shoulder portion, said cross-section tapering progressively to flat configuration at said end of the container opposite to said one end, to facilitate a uniform, flat collapse of said container progressively from said opposite end toward said one end as the contents thereof are withdrawn through said neck portion when said container is disposed in neck-downward position, said container also defining gusset portions in said body portion adjacent said shoulder portion, said gusset portions including lines of flexing weakness to facilitate collapse of said container adjacent said shoulder portion as the contents thereof are withdrawn, said gusset portions defining three sides in triangular relationship, one of said sides being adjacent and parallel to a shoulder tip at the ends of the major axis of said oval shoulder portion, and the other two sides extending from said one side of the gusset portion toward each other, said container being free of additional lines of flexing weakness positioned longitudinally of said container adjacent said neck and shoulder portion.

4,088,167

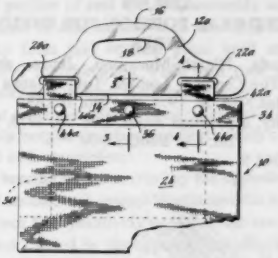
HANDBAG WITH DETACHABLE HANDLES

Lawrence B. Schwartz, Fairfield, Conn., assignor to Acricite Company, Inc., Bridgeport, Conn.

Filed Oct. 4, 1976, Ser. No. 729,168

Int. Cl.² A45C *13/26*

U.S. Cl. 150—33 **5 Claims**



1. A handbag comprising: a flexible, open top receptacle portion having first and second opposed side panels; first and second substantially similar planar handle members, each defining at least two opeings therethrough; first and second strap means, each secured at one end to one of said side panels in spaced relationship to one another, to extend through respective openings in one of said handle members; third and fouth strap means, each secured at one end to the other of said side panels in spaced relationship to one another, to extend through respective openings in the other of said handle members; and means for releasably securing the other end of each of said strap means in looped engagement with one of said handle members through one of said openings.

4,088,168

TIRE HAVING CONCAVE SHOULDERS

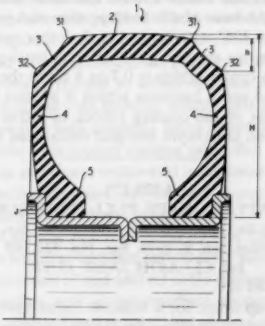
Jacques Boileau, Clermont-Ferrand, and Albert Mathevet, Chamalieres, both of France, assignors to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France

Filed Jun. 7, 1976, Ser. No. 693,968

Claims priority, application France, Jun. 12, 1975, 75 18482

Int. Cl.² B60C *11/04*

U.S. Cl. 152—352 R **4 Claims**



1. A tire of elastic material, which tire is at least partially without reinforcement and comprises a tread extended on both sides by a shoulder followed by a sidewall terminating in a bead, characterized by the fact that the shoulders are without

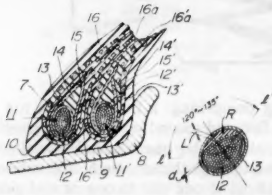
reinforcement and are each formed of a concave zone extending from the edge of the tread to the radially upper end of the sidewall, said concave zone having an average curvature which is between 0 and (1/0.2H), H being the height of the tire on a rim, said concave zone extending over a radial height h which is equal to between 5% and 40% of the height H of the tire on a rim, the circumferential deformations of said concave zone, for a deflection of the tire of between 0% and 30% of its height H on the rim, are substantially equal to the radial deformations of said concave zone, the tire being mounted on a rim and inflated.

4,088,169

REINFORCED BEAD PORTION FOR PNEUMATIC TIRES

Masahiro Kuroda, Higashi-Murayami, Japan, assignor to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Nov. 24, 1976, Ser. No. 744,854
Claims priority, application Japan, Dec. 25, 1975, 50-155480
Int. Cl.² B60C *15/04*
U.S. Cl. 152—362 R **3 Claims**



1. A reinforced bead portion for pneumatic tires comprising: a pair of bead core means, a bias carcass ply formed of a plurality of rubberized organic textile cord fabrics superimposed one upon the other and extending from one of said bead core means to the other, said pair of bead core means each composed of at least two bead cores, each one being inserted between and covered with said carcass ply and a turn-up portion thereof, each said bead core being formed by winding a plurality of rubberized metal cord layers one upon the other in radial direction with respect to the bead core, thereby forming a plurality of superimposed bands, the number of turns of said bands being at least equal to the number of metal cords of each rubberized metal cord layer, a rubberized fabric covering the total outer periphery of said band, and a sector-shaped stress absorbing rubber layer provided for at least the inside bead core and located in a sector-shaped region included between two straight radial lines diverging from the center of all of said bands of each bead core, one of said two straight radial lines extending from said center toward the inner side of the tire parallel with the base of the bead portion and inclined at an angle of 120° to 135° with respect to the other radial line, said sector-shaped stress absorbing rubber layer having a maximum thickness at its center which is 0.7 to 6 times the diameter of said metal cord and a hardness which is at least equal to the lowest hardness of the coating rubber of either one of said rubberized metal cord layer and said rubberized fabric

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4,088,170

ROMAN STYLE DRAPE PULL CORD SUPPORTS

Edna M. Franklin, 1500 NW. 35, Oklahoma City, Okla. 73118

Filed Sep. 9, 1976, Ser. No. 721,749
Int. Cl.² A47H *5/032, 11/06*
U.S. Cl. 160—84 R **3 Claims**

1. In a pull-up drape for a window frame having stiles and having a support bar horizontally secured to the window head, said drape having a width extending between said stiles, a back side, and top and bottom portions, said top portion being secured to said support bar, the improvement comprising:

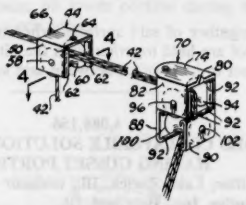
a plurality of rings secured in vertically spaced relation to the back side of said drape for forming a plurality of parallel vertical paths extending between the top and bottom portions of said drape;

an intermediate pulley support secured in depending relation to said support bar in cooperative alignment with the respective vertical path,

said intermediate pulley support including an intermediate pulley frame having a top portion flatly contacting said support bar, and having spaced-apart parallel depending end portions;

a pin extending horizontally between and secured to said intermediate pulley frame end portions;

a spool-like pulley having flanged ends journalled by said pin,



each intermediate pulley frame end portion having its vertically disposed marginal edge portions arcuately curved inwardly in confronting relation to form wings overlapping a peripheral portion of the respective flanged end of said pulley to form a horizontal pull cord guide path spaced inwardly from said flanged ends through said intermediate pulley frame; and,

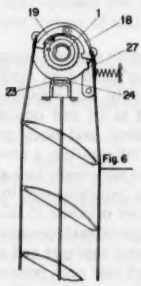
a plurality of pull cords each entrained at one end portion through the horizontal guide path of the respective intermediate pulley support and respective row of rings forming the vertical paths and secured to said drape bottom portion.

4,088,171

VENETIAN BLIND

René Schluep, Unterentfelden, and Josef Koch, Niedererlinsbach, both of Switzerland, assignors to Storen- und Maschinenfabrik Emil Schenker AG, Schonenwerd, Switzerland

Filed Sep. 29, 1976, Ser. No. 727,410
Claims priority, application Switzerland, Apr. 30, 1976, 005439/76
Int. Cl.² E06B *9/30*
U.S. Cl. 160—170 **13 Claims**



1. In a venetian blind, a combination comprising a plurality of substantially horizontal slats disposed one above the other; means for moving said slats upwardly and downwardly between upper and lower end positions; means for turning said slats between first and second end positions in which the neighboring slats respectively do not and do overlap each other and

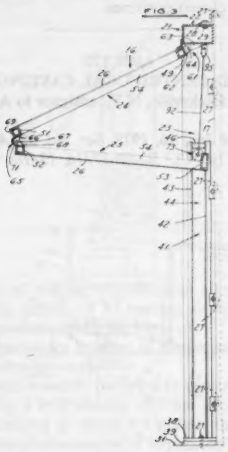
the blind is respectively open and closed; means for maintaining said slats at least close to said first end positions while said moving means is operated to move said slats upwardly so that, while moving upwardly, the neighboring slats do not overlap each other; and means for maintaining said slats in predetermined intermediate positions between said first and second end positions, in which intermediate positions the neighboring slats do not overlap each other, while said moving means is operated to move said slats downwardly.

4,088,172

DUAL PURPOSE SECURITY SHUTTER AND AWNING ASSEMBLY

Alexander Pollock, 16179 Bentler, Detroit, Mich. 48219

Filed Dec. 2, 1976, Ser. No. 746,716
Int. Cl.² E05D *15/26*
U.S. Cl. 160—193 **14 Claims**



1. A dual purpose security shutter and awning adapted to be mounted on the exterior of a building generally over the door and window elements thereof for protecting same, said assembly being positionable to both an opened position to serve as an awning in front of the building and to a closed position to serve as a security shutter which extends across the door and window elements, said assembly comprising:

a frame adapted to be secured to the front of said building about said door and window elements, said frame having a generally horizontal top support member and a pair of generally vertical opposite side members disposed between the opposite ends of said top member and a ground plane;

vertically disposed track means carried by each of the side members of said frame; each of said track means having a length less than the length of the corresponding side member; stop elements carried by said track means adjacent the upper ends thereof;

first and second generally rectangular sash assemblies each having an upper end portion, a lower end portion and a pair of side portions;

first hinge means connecting the top support member of said frame to the upper end portion of said first sash assembly for pivotally suspending said first sash assembly within said frame such that the plane of said first sash assembly is substantially vertical and generally parallel to the front of said building when said dual purpose security shutter and awning assembly is closed and such that the lower end portion of said first sash assembly swings away from said vertical plane and the plane of said first sash assembly which faces the front of said building forms an acute angle with that portion of said vertical plane vertically below said first hinge means when said dual purpose security shutter and awning assembly is opened;

second hinge means connecting the lower end portion of said first sash assembly to the upper end portion of said second sash assembly for at least partially pivotally suspending said second sash assembly within said frame such that the planes of said first and second sash assemblies are vertically coplanar when said dual purpose security shutter and awning assembly is closed and such that the angle between the plane of said second sash assembly facing the front of said building and the plane of said first sash assembly facing the front of said building decreases as the lower end portion of said first sash assembly and the upper end portion of said second sash assembly swing outwardly away from said vertical plane until an acute angle is formed therebetween when said dual purpose security shutter and awning assembly is opened;

at least one substantially planar, generally rectangular, relatively burglar-resistant panel retainably carried by each of said sash assemblies;

roller bearing means carried by the opposite side portions of said second sash assembly adjacent the lower end portion thereof for operatively engaging the corresponding track means carried by the opposite side members of said frame and riding up and down therein as said dual purpose security shutter and awning assembly is moved between said closed and opened positions; the upward movement of said roller bearing means being limited by the engagement of same with said stop elements;

winch means carried by said frame for selectively opening and closing said dual purpose security shutter and awning assembly, said winch means including cable means having one end coupled to said second sash assembly adjacent said lower end portion thereof, a rotatable drum having the opposite end of said cable means anchored thereto for winding and unwinding said cable means thereon for raising and lowering said roller bearing means within said track means, and means for driveably rotating said drum to selectively control the positioning of said sash assemblies;

said winch means being further characterized in that said rotatable drum has first and second drum portions thereon, said cable means includes first and second distinct cable elements, said one end of said first cable element being coupled to said second sash assembly adjacent one side thereof and the opposite end of said first cable element being anchored to said first drum portion, said one end of said second cable element being coupled adjacent the opposite side portion of said second sash assembly and the opposite end of said second cable element being anchored to said second drum portion such that as said drum is driveably rotated to selectively control the position of said dual purpose security shutter and awning assembly, said second sash assembly being raised and lowered from opposite ends thereof causing said roller bearing means to ride up and down within said track means thereby moving said sash assemblies between said opened awning position and said closed shutter position;

first and second pulleys carried by said top member of said frame adjacent opposite ends thereof such that an intermediate portion of said second cable element passes over said first pulley and an intermediate portion of said second cable element passes over said second pulley to transmit the rotation of said drum into the vertical translation of said roller bearing means within said track means; and

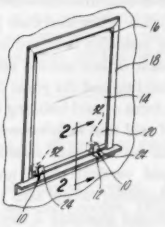
means for selectively locking said sash assemblies in said closed shutter position.

4,088,173

ANTI-FLAPPING DEVICE FOR WINDOW COVERINGS

Paul J. Antich, 32412 Vandover, St. Clair Shores, Mich. 48082

Filed Dec. 22, 1976, Ser. No. 753,223
Int. Cl.² A47G 5/02
U.S. Cl. 160—238 **4 Claims**



1. The combination of a window shade and anti-flapping device for preventing flapping of the window shade against a window glass, said combination comprising:

a window shade having an upper end attached to a window casing and a freely movable lower end;

an anti-flapping device comprising a U-shaped clip having a base and a pair of open-ended, inwardly curved legs extending from said base, said clip being fabricated from a flexible plastic material such that the opposing inner surfaces of said clip legs are movable toward and away from each other and are normally biased toward each other for releasably engaging said window shade lower end to securely attach said clip thereto;

a resilient cushion carried by the outer surface of one of said clip legs and disposed between said clip and said window glass for cushioning movement of said window shade against said window glass as the window shade moves under the action of wind; and

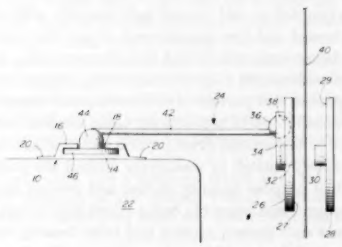
adhesive means for attaching said cushion to said outer surface portion of said one clip leg.

4,088,174

SHOWER CURTAIN ANCHOR ATTACHMENT

Douglas P. Edwards, Meadowbrook Rd., Carlisle, Mass. 01741

Filed Aug. 8, 1977, Ser. No. 822,430
Int. Cl.² E06B 3/92
U.S. Cl. 160—349 R **4 Claims**



1. A shower curtain anchor attachment for securing and guiding the lower edge of a shower curtain to bathtubs and shower enclosures comprising:

a flexible, elongated C-shaped guide track forming an elongated T-shaped channel;

a plurality of curtain anchor means to connect the lower edge of a shower curtain to said guide channel track comprising:

a circular, wafer-like anchor disc cover having a centrally disposed cylindrical protuberance on its interior surface;

a circular, wafer-like anchor disc body having a centrally-oriented depression to snugly receive the protuberance of said anchor disc cover, thereby securing a shower curtain between said anchor disc cover and said anchor disc body;

said anchor disc body having a partial spherically shaped depression on its exterior side to receive a ball joint;

said anchor disc cover and said anchor disc body forming an anchor disc means;

a thin, elongated track connector shaft having a spherically shaped ball joint at one end to be received within the partial spherically shaped depression on said anchor disc body and a circular track slide secured to its other end, said track slide to be slidably received within said channel within said guide channel track means;

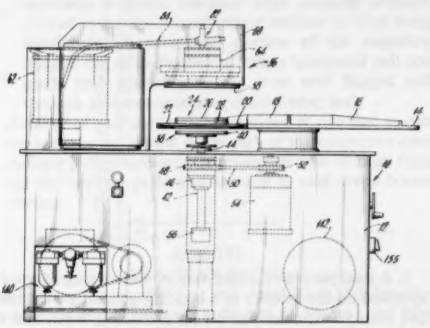
said track connector shaft serving to connect said anchor disc means to said guide channel track means such that when said shower curtain is opened and closed, said track slide moves longitudinally within said channel thereby securing the lower edge of said shower curtain in both its opened and closed positions.

4,088,175

VACUUM-FED CENTRIFUGAL CASTING MACHINE

Anthony Cecere, Hicksville, N.Y., assignor to Alfred G. Pertot, Merrick, N.Y.

Filed Jun. 16, 1975, Ser. No. 587,456
Int. Cl.² B22D 27/16, 13/10
U.S. Cl. 164—63 **10 Claims**



1. A centrifugal casting machine comprising a circular indexing table disposed on a horizontal plane, a plurality of centrifugal casting molds supported in uniformly-spaced relationship about the upper surface of said indexing table, means operatively associated with said table for rotating said indexing table periodically to bring each of said molds successively to a casting station, each centrifugal casting mold having a top-open vertically-disposed central sprue and a plurality of cavities communicating with said sprue, means operatively associated with each mold at the casting station for clamping each mold in closed condition when said mold is brought to said casting station and for rotating said mold about a central axis, a vacuum chamber located on a horizontal plane above said casting station and having an upper end and a vertically-extending funnel member mounted therein and projecting from the bottom end thereof and adapted to be brought into airtight communication with said sprue when said mold is clamped in closed condition, a reservoir for molten metal located in said machine at a position remote from said vacuum chamber and located on a horizontal plane below the level of the horizontal plane of said vacuum chamber, a feed pipe having a first end immersed in said reservoir and leading to the upper portion of said vacuum chamber the inlet of the feed pipe being located in a position such that metal cannot flow into the feed pipe without the creation of a vacuum within the pipe, a vertically-disposed nozzle connected to the second end of said feed pipe and extending into the top of said funnel member within said vac-

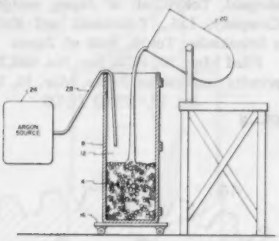
uum chamber, and means for creating a vacuum condition within said vacuum chamber when each mold is clamped in closed condition and is rotated, with said vacuum condition extending to said nozzle, funnel and said mold cavities, whereby the molten metal is drawn from said reservoir through said feed pipe by a vacuum siphoning action, and discharged directly through said funnel member and communicating sprue to said mold cavities when said mold cavities are closed and under vacuum condition.

4,088,176

METHOD OF MAKING FERROTITANIUM ALLOY

Harold Martell Simons, Orem, Utah, assignor to Billings Energy Corporation, Provo, Utah

Filed Jun. 1, 1976, Ser. No. 691,235
Int. Cl.[2] B22D *21/02*
U.S. Cl. 164—66 **9 Claims**



1. A method of making ferrotitanium alloy containing, by weight, from in excess of 30 percent titanium to about 65 percent titanium comprising the steps of

providing a container holding at least a preselected weight of molten iron or steel,

placing sponge titanium particles in a receptacle, said titanium having a bulk density of from about 0.9 grams per cubic centimeter to about 1.3 grams, the weight of said titanium being between about 30 percent and 65 percent of said preselected weight of said iron or steel, and

pouring said preselected weight of molten iron or steel onto the sponge titanium particles so that the molten iron or steel flows outwardly and downwardly throughout the titanium to thereby melt the titanium and mix therewith to form a ferrotitanium alloy having substantially the same percentage of iron or steel to titanium as in the starting materials.

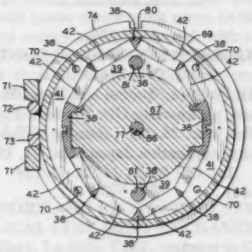
4,088,177

PERMANENT MAGNET D.C. DYNAMOELECTRIC MACHINE AND METHOD OF MAKING SAME

Frederick J. Armstrong, and Robert A. Susdorf, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Jan. 7, 1976, Ser. No. 647,136
Int. Cl.[2] B22D *19/00*
U.S. Cl. 164—109 **15 Claims**

1. A method of making a d-c motor field assembly comprising a plurality of pole pieces, yoke sections, and ceramic magnet material members, the method comprising the steps of: arranging at least two loose pole pieces, at least two loose yoke pieces, and at least two loose ceramic magnet material members so that each loose ceramic magnet material member is sandwiched between a yoke piece and a pole piece but not secured thereto; holding the at least two loose pole pieces, at least two loose yoke pieces, and at least two loose ceramic magnet material members in the sandwiched but not secured relationship within a casting cavity defined by at least two cavity establishing components so that some of the peripheral surfaces of the loose magnetic material members are bounded by the respective loose pole pieces and yoke pieces; evacuating air from the casting cavity, and admitting heated molten material into the cavity around the loose ceramic magnet material members, loose pole pieces, and loose yoke pieces and bounding the remaining portions of the peripheral surfaces of the loose magnet material members with the molten material even though the thermal shock to the magnet material members causes fracturing of the magnet material members; solidifying



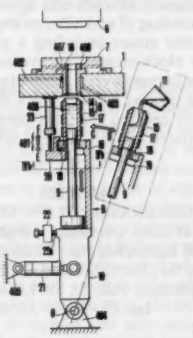
the heated molten material along the ceramic magnet material, yoke pieces, and pole pieces, and thereby establishing a solid matrix that holds the ceramic magnet material, pole pieces, and yoke pieces together as a d-c motor field assembly, with the ceramic magnet material constrained to remain sandwiched between pole and yoke pieces by the solid matrix.

4,088,178

VERTICAL DIE CASTING MACHINES

Toyoaki Ueno, Yamaguchi, and Masashi Uchida, Ube, both of Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed Feb. 3, 1977, Ser. No. 765,505
Int. Cl.[2] B22D *17/00*
U.S. Cl. 164—314 **6 Claims**



1. In a vertical die casting machine of the type comprising a stationary platen, a stationary die secured to said stationary platen, a movable die, means mounted on said stationary platen for urging said movable die against said stationary die thereby defining a die cavity therebetween, the improvement which comprises an upper casting sleeve having an axis and being secured to said stationary platen and communicating with said die cavity, a lower casting sleeve having an axis and being normally held in vertical axial alignment with said upper casting sleeve, an injection plunger contained in said lower casting sleeve, means for causing motion of said lower casting sleeve with respect to said upper casting sleeve along the aligned axes to engage and disengage said sleeves, a supporting member for supporting said lower casting sleeve when it is disengaged from said upper casting sleeve, means for tilting said lower casting sleeve between its normal position in which said lower casting sleeve is held in vertical alignment with said upper casting sleeve and a position laterally disposed from said sta-

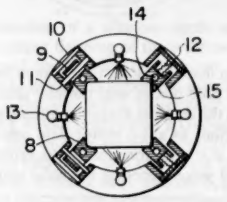
tionary platen, means for pouring molten metal into said lower casting sleeve when it is maintained at said lateral position, and first fluid pressure cylinder means pivotally connected to a stationary structure for operating said injection plunger for casting said molten metal into said die cavity, said tilting means including a second fluid pressure cylinder coupled to said first fluid pressure cylinder and a stationary structure.

4,088,179

COOLING GUIDE SYSTEM FOR CONTINUOUS CASTING MACHINE

Takashi Yabuki; Naohiro Shidara, and Tomoaki Kimura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 25, 1976, Ser. No. 670,246
Claims priority, application Japan, Apr. 21, 1975, 50-47439
Int. Cl.[2] B22D *11/24, 11/124*
U.S. Cl. 164—441 **12 Claims**



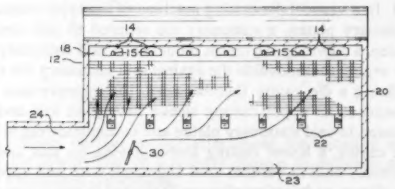
1. A continuous casting machine, comprising: means for pouring molten metal to be cast into a mould; mould means disposed below said pouring means for cooling the molten metal supplied from above into a polygonal billet having corners and flat sides between the corners, and for discharging the billet to be withdrawn downwardly; and cooling guide means provided immediately beneath said mould means and serving to promote the cooling of said billet emerging from said mould, said cooling guide means including a plurality of elongated cooling support block means for covering and facing, respectively, the entire corners over a substantial length of said billet, and each of said cooling support block means providing coolant flow passages open to the billet corners to cool the billet corners more effectively than the flat sides.

4,088,180

REGENERATOR FLOW CONTROL

Yih-Wan Tsai, O'Hara Township, Allegheny County, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 594,153, Jul. 8, 1975, Pat. No. 4,047,560.
This application Feb. 17, 1977, Ser. No. 769,746
Int. Cl.[2] F28D *17/02*
U.S. Cl. 165—1 **3 Claims**



1. A method of operating a regenerator of the type which includes a gas-pervious bed of refractory material, an air distributing space communicating with said bed along its length, and a flue communicating with said air distributing space at one end thereof; wherein during an exhaust cycle, hot exhaust gases are passed through the refractory bed thereby heating the refractory material, into the air distributing space, and out of the flue; and during a firing cycle, air is passed from the flue, to the air distributing space, and through the refractory bed to extract the heat stored in the refractory material; the improvement comprising:

positioning a baffle in the air distributing space during the firing cycle so as to divert air through a portion of the refractory bed which is subject to localized overheating in the exhaust cycle, so as to preferentially cool that portion; and

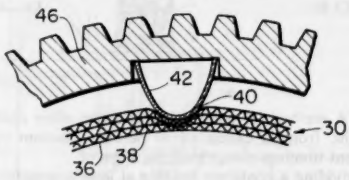
removing the baffle from the air-diverting position during the exhaust cycle so as to permit free flow of exhaust gases through the air distributing space and out the flue.

4,088,181

DISC TYPE MATRIX OF ROTARY REGENERATIVE HEAT EXCHANGER

Yoshihiro Sakaki, Suwa; Takeshi Mitomo, Kitamoto, and Akitsuna Nakagaki, Tokyo, all of Japan, assignors to Nissan Motor Company, Ltd., Yokohama and Kabushiki Kaisha Tsuchiya Seisakusho, Tokyo, both of, Japan

Filed Mar. 10, 1976, Ser. No. 665,397
Claims priority, application Japan, Mar. 11, 1975, 50-28615
Int. Cl.[2] F28D *19/00*
U.S. Cl. 165—8 **8 Claims**



1. A rotary regenerative heat exchanger for use in a gas turbine engine, comprising:

a disc type matrix arranged to be rotatable about the center axis thereof, said disc type matrix including a spirally wound stack of a flat sheet metal strip and a longitudinally corrugated sheet metal strip, the outermost layer of the matrix being formed with a part of the flat sheet metal strip, a plurality of recesses formed on the circumferential surface of the outermost layer thereof, and a plurality of portions of the wound stack, respectively adjacent to the recesses each of which portions is of a layer formed by a plurality of flat sheet metals constituting the flat sheet metal strip and a plurality of longitudinally corrugated sheet metals constituting the corrugated sheet metal strip in which each flat sheet metal is superimposed upon each corrugated sheet metal, said layer being higher in density than the other portions of the wound stack in which the intervals among the flat sheet metals are smaller than those in the other portions of the wound stack; and

driving means for forcing to rotatable said disc type matrix by applying the torque to the matrix through the recesses thereof.

4,088,182

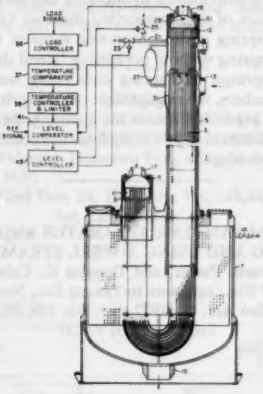
TEMPERATURE CONTROL SYSTEM FOR A J-MODULE HEAT EXCHANGER

Demetrios L. Basdekas, Rockville; George Macrae, Murrysville, and Joseph M. Walsh, Pittsburgh, all of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 29, 1974, Ser. No. 474,287
Int. Cl.[2] F28F *27/00*; G05D *23/00*
U.S. Cl. 165—32 **4 Claims**

1. A temperature controller for a tube and shell heat exchanger in which primary fluid flowing at a generally constant

rate is utilized to heat secondary fluid, said temperature controller comprising means for sensing the temperature of the effluent secondary fluid and for producing a signal representative thereof, means for supplying a pressurized gas to the shell of the heat exchanger, means for controlling the flow of gas to and from the shell, means for sensing a load and producing a signal representative of a demanded secondary fluid temperature based on that load, means for comparing the signal from the temperature sensing means and the demanded temperature



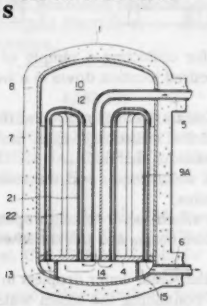
signal from the load sensing means, said comparing means producing a temperature error signal representative of the disagreement therebetween, means for producing an output signal representative of the demanded level from the temperature error signal and for limiting the demanded level output signal to some predetermined value, whereby said flow control means is responsive to said output signal to change the level of primary fluid in the shell and vary the effective heat transfer surface of the heat exchanger to control the temperature of the effluent secondary fluid.

4,088,183

THERMAL ENERGY STORAGE TANK

Shunichi Anzai, Hitachi; Akira Uenishi, Mito, and Takeshi Sakamoto, Ibaraki, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 30, 1977, Ser. No. 782,939
Int. Cl.² F28D *21/00*
U.S. Cl. 165—104 S **1 Claim**



1. A thermal energy storage tank, comprising:

a container covered with a heat insulating wall from externally, said container including a void space portion in its upper portion, and a lower distributing room in its lower portion, with its intermediate portion filled with a phase changeable thermal energy storage material;

an inlet tube connecting said upper space portion to the exterior of said container;

a descending tube directing a heat transfer medium supplied through said inlet tube from said upper space portion to said lower distributing room; and

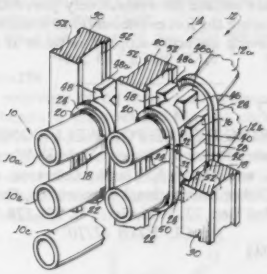
heat exchange tubes allowing said heat transfer medium stored in said lower distributing room to ascend through said thermal energy storage material, with said heat transfer medium being distributed for respective heat exchange tubes, and then back to a confluent room partitioned within said lower distributing room, said heat exchange tubes being positioned in equal spacing from each other and provided in plural number.

4,088,184

TUBE SUPPORT AND PROTECTION SYSTEM FOR HELICAL COIL HEAT EXCHANGERS

Leonardo Cavallaro, La Jolla, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Mar. 10, 1976, Ser. No. 665,456
Int. Cl.² F28F *9/00*
U.S. Cl. 165—162 **12 Claims**



1. In a heat exchanger, a tube bundle comprising at least one helical coil having a plurality of tube convolutions, a plurality of discrete tube support members selectively disposed on adjacent tube convolutions of said helical coil at selected azimuth positions about the axis of said coil, means securing said discrete support members on selected pairs of adjacent tube convolutions so as to secure the tube convolutions of each of said selected pairs of tube convolutions in substantially fixed spaced relation with each of said selected pairs being secured together independently of the other selected pairs of tube convolutions, said support members at each selected azimuth position being disposed in axially aligned relation along the axial length of the coil and cooperating to support said tube convolutions in the axial direction of said coil at said azimuth positions.

4,088,185

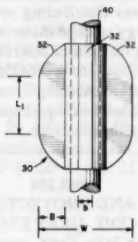
MOLDED PLASTIC PARAFFIN SCRAPERS AND CENTRALIZERS

Forrest Leon Carson, Houston, Tex., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation of Ser. No. 532,659, Dec. 13, 1974, abandoned, which is a continuation of Ser. No. 387,567, Aug. 10, 1973, abandoned. This application Aug. 10, 1976, Ser. No. 713,154
Int. Cl.² E21B *37/02*
U.S. Cl. 166—176 **8 Claims**

1. An improved sucker rod having at least one molded paraffin scraper/rod centralizer thereon, comprising: a rod and a rod centralizer formed about the rod at a selected point along the length of the rod by the process of injection molding and shrink fitting in place said rod centralizer, said rod centralizer consisting of thermoplastic polyamides, nylon resins including Zytel nylon, nylon resins designated type 6/10, 6/6 and 6 by

the 1971–1972 Modern Plastics Encyclopedia, polyacetal, polyvinylidene chloride, polyester, diallylphthalate, polytetra fluora ethylene, polychloro-trifluoro ethylene, polymethyl alpha chloroacrylate having a shrinkage factor of about 0.01 inch-inch per inch whereby upon cooling and solidifying the rod centralizer firmly grips the rod so tightly that a force in excess of 1800 pounds is required to cause said centralizer to



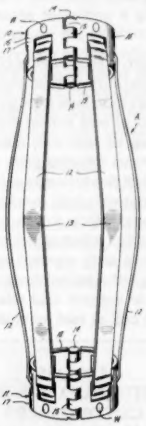
move on the rod, the rod centralizer being formed with a central body and radially extending blade means disposed about the central body, said blade means presenting a scraping edge and contact surface for respectively preventing paraffin build-up and bearing the forces encountered in centralizing and scraping and having inwardly sloping surfaces at the top and bottom thereof.

4,088,186

CENTERING DEVICE FOR WELL CONDUIT

Rudy B. Callihan; Thomas E. Bagley; Alvin K. Warzecha, all of San Antonio, and David J. Vlasek, Converse, all of Tex., assignors to Baker International Corporation, Orange, Calif.

Filed Dec. 22, 1976, Ser. No. 753,178
Int. Cl.² E21B *17/10*
U.S. Cl. 166—241 **8 Claims**



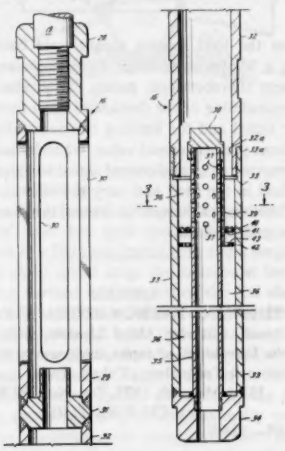
1. A centering device adapted to be mounted on a running-in string to be disposed in a well bore, comprising: upper and lower companion supporting members having a plurality of circumferentially spaced openings therein, shoulder members on each of said upper and lower companion supporting members circumferentially extending around the uppermost interior of said supporting members, circumferentially spaced outwardly bowed springs having a point of stress and upper and lower ends overlying the exterior of said supporting members and extending inwardly through said openings, said springs having portions disposed in said openings, said springs having immediate each end thereof a fulcrum, an inwardly extendible incline defined immediate said fulcrum, each of said spring ends conforming to the curvature of the respective supporting member and adapted to be substantially parallel to the axis of said respective supporting member, said incline defining the point of stress of said bowed springs, the upper and lower ends of said springs respectively engaging the circumferentially extending shoulders of said support members, said portions of said springs including extensions received within said openings whereby each of said spring extensions longitudinally overlaps that portion of said supporting member defining, in part, said opening to interlock said spring extension with said portion of said supporting member to prevent removal of said spring portion from said support, said opening receiving said spring without permitting lateral shifting movement of said springs, said spring ends being welded to said supporting members, the engagement of said spring ends upon said shoulders providing means for applying the weld of the spring ends and the shoulders away from the point of stress and toward said shoulders.

4,088,187

WELL STEAM SAMPLER APPARATUS AND METHOD OF FORMING AND USING A WELL STEAM SAMPLER

Curtis E. Howard, Porter, and Douglas G. Calvin, Missouri City, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Apr. 21, 1977, Ser. No. 789,391
Int. Cl.² E21B *47/00*
U.S. Cl. 166—264 **16 Claims**



1. A method for collecting a sample of the steam water droplets at any desired location down in a well comprising the steps of,

(a) passing the steam that has arrived at the desired location into a cylindrical collecting vessel having a tube means forming an annulus therein,

(b) passing the steam vapor and the steam water droplets into the annulus,

(c) passing the steam vapor through openings in the upper end of the tube means and out the lower end of the tube means,

(d) collecting the steam water droplets in the annulus, and

(e) effectively containing the steam water droplets in the annulus with perforated baffles during vapor flashing when recovering the collecting vessel for preventing spillage and slushing of the water.

15. A sampler for collecting a sample of hot steam at any desired depth in a well comprising,

(a) a collecting vessel having open upper and lower ends,

(b) tube means in said collecting vessel for receiving steam

from said collecting vessel upper end and for ejecting it through a lower end of said tube means,

(c) said tube means forming a closed ended annulus between said tube means and said collecting vessel,

(d) openings in said tube means for permitting the steam therein to pass out into said annulus for trapping the steam water droplets in the annulus as the vapor passes back into said tube means for ejection out the bottom of the collecting vessel, and

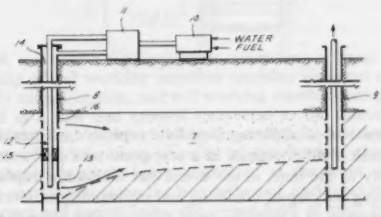
(e) baffle means for preventing spillage and slushing of said hot steam water droplets due to vapor flashing when the pressure is bled off for recovery of the steam water droplets.

4,088,188

HIGH VERTICAL CONFORMANCE STEAM INJECTION PETROLEUM RECOVERY METHOD

Richard H. Widmyer, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,365
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—269 **12 Claims**



1. In a method of recovering viscous petroleum from a subterranean, permeable, porous, viscous petroleum-containing formation, said formation being penetrated by at least two spaced apart wells in fluid communication with the formation, of the type wherein saturated steam comprising a liquid phase and a gaseous phase is injected into at least one well, said steam passing through the formation, displacing petroleum and reducing the petroleum viscosity, wherein the improvement comprises:

(a) separating the steam into two fractions, one of which is substantially all vapor phase and the other of which is substantially all in the liquid phase;

(b) injecting the vapor phase fraction of the steam at or near the bottom of the petroleum formation; and

(c) injecting the liquid fraction at or near the top of the petroleum formation.

4,088,189

SURFACTANT OIL RECOVERY PROCESS USABLE IN HIGH TEMPERATURE FORMATIONS CONTAINING HIGH SALINITY WATER

Russell D. Shupe, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 526,780, Nov. 25, 1974, Pat. No. 4,018,278. This application Dec. 1, 1976, Ser. No. 746,647
Int. Cl.[2] E21B *43/22, 43/24*
U.S. Cl. 166—272 **35 Claims**

1. A method for recovering petroleum from a subterranean, permeable, petroleum-containing formation penetrated by at least one injection well and by at least one production well, both wells being in fluid communication with the formation, said formation temperature being from about 70° F. to about 300° F., said petroleum formation also containing water whose salinity is from about 70,000 parts per million to about 220,000 parts per million total dissolved solids, comprising:

(a) injecting an aqueous, saline surfactant fluid into the formation via the injection well, said fluid containing a surfactant having the following formula:

$$RO(R'O)_nR''SO_3^-M^+$$

in which R is an alkyl or alkylaryl radical having from 8 to 24 carbon atoms, R′ is ethyl or a mixture of ethyl and propyl with relatively more ethyl than propyl, R″ is ethyl, propyl, hydroxypropyl or butyl, n is a number from 1 to 20, and $M^+$is a monovalent cation, wherein the number of carbon atoms in the alkyl chain and the number of ethylene oxide units are balanced to achieve the minimum interfacial tension at about the same salinity as the formation water and at a temperature about equal to the formation temperature, said surfactant fluid being injected at a temperature in degrees F which is at least equal to a value which is 100° less than the formation temperature in degrees F, said fluid displacing petroleum through the formation toward the production well; and

(b) recovering petroleum from the formation via the production well.

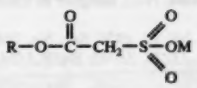
4,088,190

CARBON DIOXIDE FOAM FLOODING

Paul W. Fischer, Whittier; LeRoy W. Holm, Fullerton, and David S. Pye, Brea, all of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Feb. 10, 1977, Ser. No. 767,529
Int. Cl.[2] E21B *43/22*
U.S. Cl. 166—274 **14 Claims**

1. In the recovery of oil from a subterranean oil-bearing reservoir wherein a water based foamed carbon dioxide is introduced into the reservoir and then driven through said reservoir from an injection well toward a production well by means of a drive fluid, the improvement which comprises employing in said foamed carbon dioxide a foaming agent having the formula:



wherein R is a straight chain alkyl radical having from 10 to 16 carbon atoms; and M is an alkali metal or ammonium cation.

4,088,191

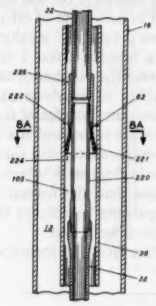
HIGH PRESSURE JET WELL CLEANING

Stanley O. Hutchison, Bakersfield, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 274,783, Jul. 24, 1972, abandoned, which is a division of Ser. No. 150,536, Jun. 7, 1971, Pat. No. 3,720,264. This application Jul. 30, 1976, Ser. No. 709,976
Int. Cl.[2] E21B *21/00*
U.S. Cl. 166—223 **1 Claim**

1. Apparatus for jet washing a well liner positioned adjacent a fluid producing formation to clean openings in said liner comprising first tubing means forming a flow path from the earth's surface to a location adjacent a well liner positioned adjacent a fluid producing formation, a source of high pressure liquid, rotating swivel means rotatably connected on said first tubing means above the earth's surface, a flow path through said rotating swivel means, an opening in said tubing means communicating with said flow path in said rotating swivel, conduit means connecting the flow path of said rotating swivel with said source of high pressure liquid, jet tool means connected to the end of said first tubing means adjacent said liner for jetting high pressure liquid at the openings in said well liner, a second tubing means arranged concentrically around said first tubing means, said second tubing means extending from the earth's surface below said rotating swivel means to a location adjacent said liner in said well below said jet tool means, a foam source, conduit means connecting said foam source with said second tubing means and a check valve for

permitting flow in one direction and preventing flow in the opposite direction in the annular passageway formed between said first tubing means and said second tubing means, said check valve comprising a resilient member having a Shore



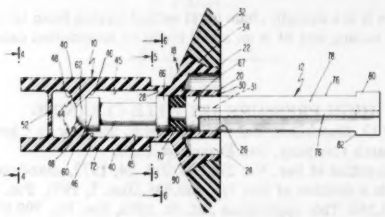
hardness of greater than 40 and less than 90 and having one end mounted on the exterior of said first tubing means and the other end flared outwardly and downwardly from said first tubing means and engaging the inside wall of said second tubing means.

4,088,192

HEAT ACTIVATED PLUNGER

Lee Lamond, Flanders, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Jul. 16, 1976, Ser. No. 706,038
Int. Cl.[2] A62C *13/24, 13/42*; B65B *3/04*; F16K *17/40*
U.S. Cl. 169—19 **19 Claims**



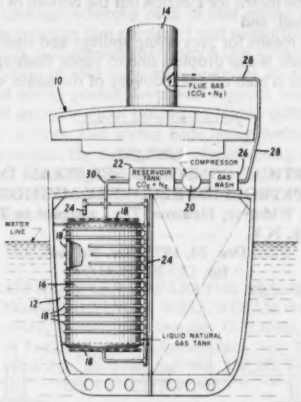
1. A heat actuated apparatus comprising:
a base;
a pair of spreadable stop fingers joined to and extending forwardly from said base, said fingers each including an inclined surface, said surfaces converging in a forward position,
a fusible element interconnecting said stop fingers to restrain said stop fingers from spreading, and a forwardly biased plunger having surfaces converging in a forward position slidably mounted in said base and normally abutting said stop fingers in a first mode of operation;
said forwardly biased plunger being operable, in response to melting of said fusible element and as a result of the action of the plunger's converging surfaces on the converging surfaces of the spreadable stop fingers, to spread said stop fingers apart and travel forwardly in a second mode of operation.

4,088,193

APPARATUS FOR INHIBITING EXPLOSIVE MIXING OF LIQUID NATURAL GAS AND WATER

Stirling A. Colgate, General Delivery, Ward, Colo. 80481

Filed Feb. 2, 1976, Ser. No. 654,518
Int. Cl.[2] A62C *13/40*
U.S. Cl. 169—45 **6 Claims**



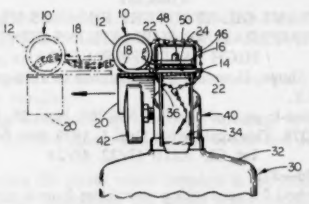
5. A method of inhibiting fluid-fluid explosive self-mixing of a cryogenic fluid contained in a cryogenic tank and water in proximity to the tank, in the event that the tank is ruptured, comprising the step of confining and maintaining an inert gas under pressure in a multiplicity of tubes located close to each other and surrounding the tank and thermally insulated from the tank to prevent liquefication of the inert gas contained in the tubes, the pressure of the inert gas in the tubes being substantially higher than the highest water pressure to which the cryogenic fluid may be subjected in the event of rupture of the tank such that the inert gas flows from the tubes and forms a blanket of inert gas that inhibits forced contact between the cryogenic fluid and the water upon rupture of any tube or tubes.

4,088,194

COMBINATION GAUGE SHIELD AND LOCK PIN FOR A FIRE EXTINGUISHER

Harold D. Hard, Columbus, Ohio, assignor to The MAP Corporation, Bowling Green, Ohio

Filed Nov. 10, 1976, Ser. No. 740,408
Int. Cl.[2] A62C *13/00*
U.S. Cl. 169—75 **6 Claims**



1. In a pressurized fire extinguisher having a valve, a handle for operating said valve, a pressure gauge adjacent said valve, and a removable lock pin for preventing the operation of said valve, the improvement comprising:
(A) a shield welded to said locking pin for shielding at least the upper portion of said gauge,

(B) means for preventing the rotation of said lock pin while in its valve locking position, and

(C) a breakable connection between said locking pin and said handle for normally preventing the removal of said locking pin from its valve locking position.

4,088,195

SOIL CULTIVATING IMPLEMENTS

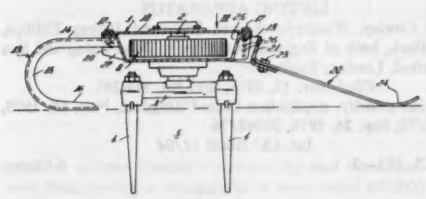
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Jun. 4, 1976, Ser. No. 692,784

Claims priority, application Netherlands, Jun. 10, 1975, 7506857

Int. Cl.² A01B *33/06*

U.S. Cl. 172—59 **13 Claims**



1. A soil cultivating implement comprising a frame and a plurality of soil working members rotatably mounted on upwardly extending axes, said soil working members being positioned in a row that extends transverse to the direction of travel and said members being journalled in an elongated portion of said frame, a plurality of side-by-side, elongated strip-shaped brackets being connected at the front of said frame portion and along the length thereof, said brackets having upper and lower limbs, the upper limb of each bracket being fastened to said frame portion and extending forwardly to a substantially 180° curved base, the lower limbs bearing on the ground and being positioned adjacent one another, whereby said row of soil working members is protected from debris in and on the ground surface during forward travel.

4,088,196

SOIL CULTIVATING IMPLEMENTS

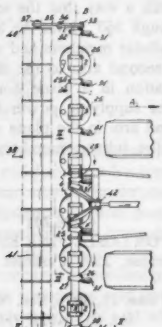
Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland

Filed Apr. 6, 1976, Ser. No. 674,165

Claims priority, application Netherlands, Apr. 11, 1975, 7504319

Int. Cl.² A01B *21/06*

U.S. Cl. 172—155 **4 Claims**



1. A soil cultivating implement comprising a frame and a transverse row of soil working members rotatably mounted on respective stub shafts that define upwardly extending axes, each soil working member having downwardly extending tines positioned around its axis of rotation and being freely rotatable about its corresponding axis responsive to the contact of its tines with the ground, said soil working members being releaseably fastened with respective brackets on an elongated beam that extends transverse to the direction of travel, the stub shafts of said soil working members being held in said brackets, said brackets being positioned directly below said beam and being obliquely inclined to the vertical, said shafts being substantially parallel to one another and located in a transverse plane that extends substantially perpendicular to the normal direction of implement travel, each of said brackets being channel shaped with a base positioned between limbs, said limbs having dissimilar vertical lengths and said base being inclined to the horizontal, a respective stub shaft being journalled in said base, said tines each having a substantially straight soil working portion that in the lowest position of the tine, extends obliquely forwardly with respect to the front of the machine, a ground engaging roller being positioned to the rear of said row of soil working members and said roller being connected to the frame and supporting same, said roller extending at least partly across the working width of the implement, the axis of rotation of said roller extending substantially horizontal and parallel to said plane.

4,088,197

POWER TOOL

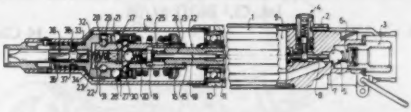
Karl Roll, Leinfelden; Alfred Hettich, Stetten; Hubert Stahl, Giengen, and Werner Keil, Heidenheim, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Jan. 28, 1976, Ser. No. 653,253

Claims priority, application Germany, Feb. 8, 1975, 2505393

Int. Cl.² B25D *23/145*

U.S. Cl. 173—12 **19 Claims**

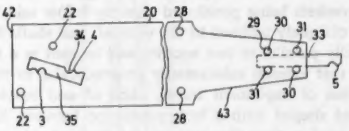


1. In a power tool, particularly a power screwdriver, of the type provided with a built-in motor, particularly a pneumatic motor, in combination, motor switch means; a tool holder; a transmission connecting the motor to the tool holder, the transmission including torque-responsive clutch means operative for continually transmitting rotary motion and torque from the motor to the tool holder in a first manner when the torque being transmitted by the clutch means is below a preselected value and operative for continually transmitting rotary motion and torque from the motor to the tool holder in a distinguishable second manner when the torque being transmitted by the clutch means is above the preselected value, and including a clutch component which performs a shifting motion when the clutch means torque rises to such value; automatic torque-responsive turn-off means including a push rod and means responsive to the performance of the shifting motion by the clutch component for causing the push rod to perform a movement causing the switch means to turn off the motor; and override means activatable by the user for overriding the operation of the automatic torque-responsive turn-off means by preventing the push rod from causing the switch means to turn off the motor, whereby the user of the power tool can cause the clutch means to indefinitely transmit rotary motion and torque higher than the preselected value from the motor to the tool holder.

4,088,198
LOAD LEVER

Armin Wirth, Zurich, Switzerland, assignor to Wirth, Gallo & Co., Switzerland

Filed Jun. 15, 1976, Ser. No. 696,286
Claims priority, application Germany, Jun. 26, 1975, 2528426
Int. Cl.[2] G01G *21/00*
U.S. Cl. 177—258 2 Claims

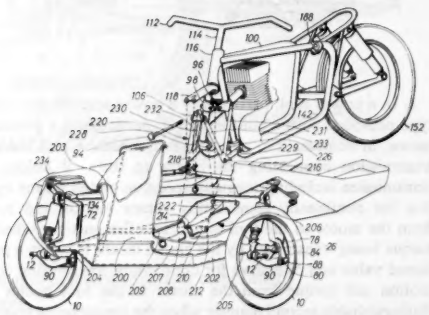


1. A load lever for transmitting forces in a balance comprising:
two substantially parallel webs,
at least one distance sleeve separating said webs,
first fastening means for holding said webs together,
at least one pair of pins mounted at one end of said parallel webs,
a first knife bearing body slidably mounted in a longitudinal direction between said at least one pair of pins,
second fastening means for fixing said first knife bearing body at a selected longitudinal position, and
a second knife bearing body position on the other end of said parallel webs and containing on one end a support knife and on the other end a load knife, said second knife bearing body passing through holes in at least one of said parallel webs.

4,088,199
STABILIZED THREE-WHEELED VEHICLE

Wolfgang Trautwein, 4502 Choctaw Cir., Huntsville, Ala. 35801

Continuation-in-part of Ser. No. 660,729, Feb. 23, 1976, Pat. No. 4,020,914. This application Feb. 18, 1977, Ser. No. 769,946
Int. Cl.[2] B62D *61/06*
U.S. Cl. 180—25 R 14 Claims

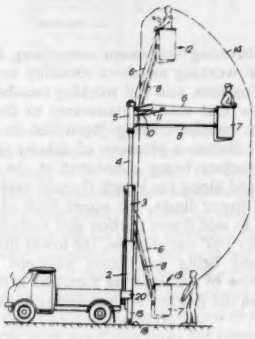


1. In combination with a motorcycle-type frame, engine, and rear drive wheel configuration, the improvement comprising:
first and second spaced front wheels, each having a wheel mounting support;
parallelogram coupling means comprising first and second, spaced one above the other, cross members pivotally interconnected between said wheel mounting supports of said front wheels, and each cross member being centrally and pivotally attached to said frame;
a foot resting platform extending rearward from the lower of said cross members on each side of and spaced from the lower portion of said frame; and
steering means pivotally supported by said frame, and including means pivotally connected to said wheel mounting supports of said front wheels for rotating said wheel mounting supports and said front wheels in unison about axes perpendicular to the spin axes of the wheels;
whereby a rider may apply a stabilizing force between the frame and front wheels for holding the vehicle upright while stopped and while operating at low speeds without contacting the ground, and by leaning and applying a force by one of his feet to a portion of the platform on one side of the vehicle, the rider may effect a banking operation wherein the planes of all three wheels of the vehicle are essentially parallel, and said platform remains essentially parallel to the ground at all times.

4,088,200
LIFTING APPARATUS

David Cowley, Wingerworth, and Raymond Jeffrey Phillips, Matlock, both of England, assignors to John Laing and Son Limited, London, England

Filed Nov. 11, 1976, Ser. No. 741,287
Claims priority, application United Kingdom, Nov. 18, 1975, 47368/75; Sep. 26, 1976, 39368/76
Int. Cl.[2] B66E *11/04*
U.S. Cl. 182—2 6 Claims



1. Lifting apparatus including a telescopically extending arm, a plurality of tubular members constituting the arm, a base, means to pivot the arm about the base, a plurality of telescopically extendable outrigger legs arranged to provide support to the apparatus and a second arm, means for rotatably attaching the second arm to the one of the tubular members remote from the base, a motor, the motor being coupled to the second arm in such a way that the second arm is rotatable continuously through 360° about the longitudinal axis of the said one of the tubular members and means for rotatably attaching the said second arm to the said one of the tubular members for rotation in a plane containing the said axis, wherein means for supplying power for the motor and for rotating the second arm in the plane containing the axis are arranged within the tubular members constituting the first mentioned arm.

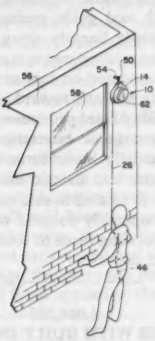
4,088,201
PORTABLE FIRE ESCAPE

James L. MacFarlane, 2209 Paradise Rd., Las Vegas, Nev. 89104

Filed Jun. 21, 1976, Ser. No. 698,051
Int. Cl.[2] A62B *1/08*
U.S. Cl. 182—5 4 Claims

1. A fire escape device comprising: a spool; spool support means for journalling said spool for rotation, said support means being adapted to be maintained elevated relative to ground level; a support line wound about said spool for selective unwinding; means on the free end of said line for carrying a human body; a generally cylindrical rotor coupled coaxially

to said spool for joint rotation therewith, said rotor having a smooth, uninterrupted circumferential periphery; a stationary housing carried by said support means defining a fluid-tight generally cylindrical smooth, uninterrupted chamber having a



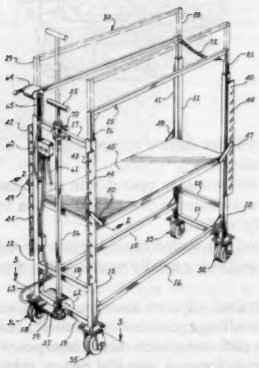
constant volume coaxially surrounding said rotor, and a viscous fluid having a viscosity of at least about 650,000 centistokes in said chamber completely filling said chamber for retarding rotation of said rotor by exerting a viscous friction force on said circumferential periphery of said rotor.

4,088,202

SCAFFOLDING CART

Clifford T. Costello, 9654 S. Nogales Hwy., Tucson, Ariz. 85706

Filed Aug. 25, 1976, Ser. No. 717,473
Int. Cl.[2] E04G *1/20*; B60K *7/00*; E04G *1/24*
U.S. Cl. 182—13 **15 Claims**



1. A powered steerable scaffolding cart having a vertically positionable platform and handrails for transporting a workman, said scaffolding cart comprising in combination:

a. a framework including a vertical post disposed at each corner of said framework and cross members extending intermediate said vertical posts;

b. a wheel assembly secured in proximity to each corner of said framework for supporting said framework;

c. power means attached to one of said wheel assemblies for propelling said scaffolding cart;

d. pivot means attached to said one wheel assembly for pivoting said one wheel assembly;

e. steering means secured to said framework for pivoting said one wheel assembly with respect to said cart, said steering means being fixedly secured to said framework at a point laterally displaced from the vertical post in proximity to said one wheel assembly, said steering means including:

i. a handle accessible to the workman;

ii. telescoping tubing elements for raising and lowering said handle commensurate with vertical repositioning of said platform; and

iii. chain and sprocket means interconnecting said tubing elements and said one wheel assembly for pivoting said one wheel assembly on commensurate pivotal movement of said handle;

f. control means for regulating the operation of said power means, said control means including positionable support means for raising and lowering said control means commensurate with vertical repositioning of said platform; and

g. attachment means for supporting said platform from said framework, said attachment means comprising:

i. a plurality of slanted slots disposed in said vertical posts; and

ii. a plurality of hangers pivotally attached to said platform, each said hanger including a stud for engaging one of said slots;

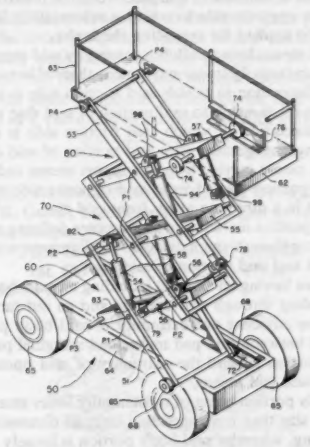
whereby, said platform is readily vertically positionable by reengaging said hangers with different ones of said slots and the speed and direction of travel of said scaffolding cart is under the control of the workman supported upon said platform regardless of the vertical position of said platform.

4,088,203

ADJUSTABLE SCAFFOLD

Raymond E. Smith, Jr., 385 E. Greenwood, Lake Forest, Ill. 60045

Filed Nov. 3, 1976, Ser. No. 738,599
Int. Cl.[2] E04G *1/22*
U.S. Cl. 182—141 **6 Claims**



1. An adjustable scaffold comprising:

a base;

a platform connected to said base; and

means for raising and lowering said platform above said base, comprising

first and second scissors connectors between said platform and said base, each of said scissors connectors having an inner member pivotally connected to two outer members, said first and second scissors connectors being pivotally joined to each other at ends of their members, and

a pair of hydraulic cylinders, each of said cylinders having a bottom end pivotally attached to the inner member of said first scissors connector at a position closer to the middle than to an end of said inner member, and a pair of lever

brackets, each of said lever brackets being pivotally attached to a top end of each of said pair of hydraulic cylinders, each of said lever brackets further being secured to an outer member of said second scissors connector at a position closer to an end than to the middle of the outer member.

4,088,204

MECHANICAL DISC BRAKE INCLUDING FLOATING ACTUATOR

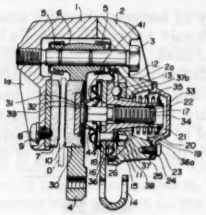
Tetsuo Haraikawa, Funabashi, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Feb. 15, 1977, Ser. No. 768,904

Claims priority, application Japan, Feb. 20, 1976, 51-17796; Feb. 20, 1976, 51-17798

Int. Cl.² F16D 65/38

U.S. Cl. 188—71.7 **10 Claims**



1. In a disc brake:

a rotatable disc to be braked;

fixed support means;

friction pad means having a friction side for engaging a portion of one side of said disc when the brake is operated and an opposite side to which a substantially linear force may be applied for operating the brake,

said pad means being shiftably carried by said support means for substantially linear movement thereof between a normal disposition in which said friction side is in adjacent facing relationship to said portion of said disc and a braking disposition in which said friction side is in forceful braking engagement with said portion of said disc;

housing means carried by said support means and including a leg portion spaced from said opposite side of said pad means in a direction away from said disc,

said leg portion including wall structure defining a clearance opening therethrough disposed in alignment with said pad means and said portion of said disc;

nut means having an axis and including an axial body portion extending through said opening and an out-turned flange portion adjacent one extremity of said body portion disposed between said pad means and marginal parts of said leg portion around the extremity of said opening proximate said pad means,

said body portion being of substantially lesser external transverse size than corresponding internal dimensions of said opening, whereby said body portion is loosely receivable within said opening in spaced relationship to said wall structures defining said opening;

means for floatingly mounting said nut means on said leg portion for rotation of said nut means about said axis thereof and for substantially linear movement of said nut means along said axis toward and away from said pad means, and for maintaining said axis substantially centered with respect to said opening for keeping said body portion in spaced relationship to said wall structures,

said mounting and maintaining means including spring means operably intercoupled with said leg portion and said nut means for yieldably biasing the latter along its axis in a direction away from said pad means to urge said flange portion toward said marginal parts of said leg portion, and guide means having cooperating guiding structures and associated bearing elements operably coupling said flange portion and said marginal parts for permitting and substantially limiting relative motion therebetween to said rotational and linear movements;

motion conversion means, including ramp means operably associated with said guide means, for shifting said nut means substantially linearly along said axis toward said pad means when said nut means is rotated in one direction;

push rod means mounted on said nut means and extending therefrom along said axis toward and into proximity with said opposite side of said pad means for engagement of the latter by the proximate extremity of said rod means to apply a substantially linear force to said pad means for shifting the latter into its said braking disposition when said nut means is rotated in said one direction; and

operating means operably coupled with said nut means for applying an operating force to rotate the same in said one direction about said axis.

4,088,205

BRAKE CYLINDER WITH BUILT-IN SLACK ADJUSTER, INCLUDING MEANS FOR MANUALLY RESETTING PISTON TRAVEL

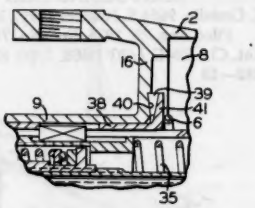
Josef Frania, Hanover, and Erhard Lehnert, Dollbergen, both of Germany, assignors to WABCO Westinghouse G.m.b.H., Hanover, Germany

Filed Dec. 16, 1976, Ser. No. 751,544

Claims priority, application Germany, Jan. 21, 1976, 2602052

Int. Cl.² F16D 65/56

U.S. Cl. 188—196 D **2 Claims**



1. A brake cylinder device comprising:

(a) a fixed casing;

(b) a piston reciprocably operable in said casing and effective upon movement in one axial direction for providing a brake-applying force;

(c) a piston rod connected to said piston for axial movement therewith and being axially positionally adjustable relative thereto;

(d) automatic slack adjuster means including screw-threaded means providing a connection between said piston and said piston rod, and clutch means interposed between said screw-threaded means and said piston, said clutch means being engageable during movement of said piston in said one axial direction for inhibiting rotation of said screw-threaded means and being disengageable during axial movement of said piston in a return direction for effecting rotation of said screw-threaded means and consequent incremental and accumulative adjustment of the relative axial position between the piston and the piston rod in response to each axial movement of the piston in said one axial direction in excess of a certain predetermined increment, and for limiting axial movement of the piston to said predetermined increment during the next following axial movement in said one axial direction; and wherein the improvement comprises:

(e) a piston barrel having one end rigidly secured to said piston for axial movement therewith and extending coaxially therefrom with the opposite end extending exteriorly of the casing and accessible for manual rotation, said

piston barrel being rotatably connected with said screw-threaded means through said clutch means and being effective, when manually rotated in one angular direction and acting through said clutch means, for effecting axial adjustment of said piston rod relative to said piston in an opposite direction relative to said one axial direction;

(f) a guide sleeve coaxially interposed between said casing and said piston barrel for guiding axial movement of the piston barrel and being keyed thereto for manual rotation therewith, said guide sleeve having a radial flange formed thereon and disposed in oppositely facing relation with a radial wall formed on said casing; and

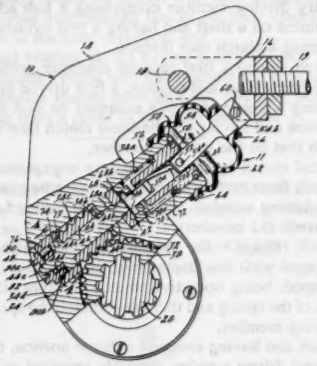
(g) an annular friction member of wedge-shaped cross-sectional area and disposed in a complementarily shaped annular groove formed cooperatively by said radial flange and said radial wall, said friction member being biasingly compressed therebetween for frictionally engaging the respective adjacent surfaces thereof and normally inhibiting relative rotation therebetween but being yieldable to manual rotational force applied to the piston barrel.

4,088,206

CLEARANCE SENSING BRAKE ADJUSTER

Wayne H. Garrett, Troy; Theodore H. Stringer, III, and Ted Zbikowski, both of Southfield, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Mar. 31, 1977, Ser. No. 783,259
Int. Cl.² F16D *65/56*
U.S. Cl. 188—196 D **37 Claims**



1. An adjuster for automatically controlling clearance within predetermined limits between first and second relatively moveable friction members which are engaged to diminish such relative movement in response to movement of actuator means in one direction and which are disengaged to allow such relative movement in response to movement of the actuator means in another direction, said adjuster comprising:

adjustable means moveable in a clearance decreasing direction and in a clearance increasing direction;

adjusting means for moving said adjustable means in said clearance decreasing direction in response to movement of said actuator means in one of said engaging and disengaging directions and in said clearance increasing direction in response to movement of said actuator means in the other of said engaging and disengaging directions;

force limiting means for preventing movement of said adjustable means by said adjusting means when the force required for moving said adjustable means exceeds the force limit of said force limiting means; and

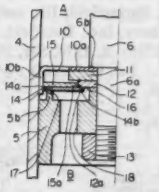
a device operative to allow a predetermined maximum amount of movement of said adjustable means in one of said clearance adjusting directions during a portion of actuator movement in one of said engaging and disengaging directions and therefore operative to apply a force in excess of said force limit during the remainder of the actuator movement in said one of said engaging and disengaging directions for preventing further movement of said adjustable means in said one of said clearance adjusting directions.

4,088,207

DAMPING FORCE GENERATING DEVICE IN HYDRAULIC SHOCK ABSORBER

Tetuo Kato, Yokohama, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed May 14, 1976, Ser. No. 686,666
Claims priority, application Japan, May 23, 1975, 50-61750
Int. Cl.² F16F *9/348*
U.S. Cl. 188—322 **4 Claims**



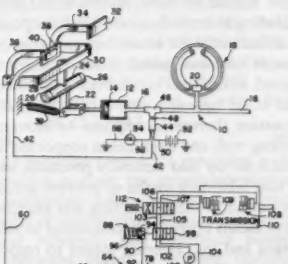
1. In a hydraulic shock absorber having therein at least two liquid spaces, and a liquid space partitioning member partitioning said two spaces, a damping force generating device mounted on the liquid space partitioning member for controlling oil flow flowing across the liquid space partitioning member in the opposite directions in response to the extension and contraction strokes of the shock absorber, said device comprising a first annular resilient valve disc and a second annular resilient valve disc in overlapping relation with one another, and an annular member secured to the liquid space partitioning member, the outer peripheral surface of said annular member being slidably engaged by the inner peripheral surface of the second disc, and one face of said annular member being engaged by the inner peripheral portion of one face of the first disc to act as a valve seat in cooperation with said first disc.

4,088,208

TRANSMISSION DISCONNECT SYSTEM

Frederick R. Goode, Lindenhurst, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Oct. 26, 1976, Ser. No. 735,298
Int. Cl.² B60K *41/26*; F16D *41/24*
U.S. Cl. 192—4 A **4 Claims**



1. In a vehicle having a fluid brake circuit, a hydraulically actuated power transmission clutch and an electrical brake

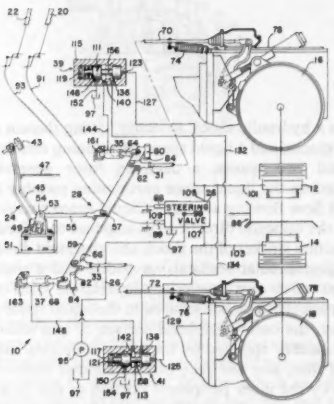
light circuit including a bulb and a normally open, pressure sensitive switch for energizing said bulb in response to the presence of a predetermined pressure in said fluid brake circuit, a hydraulic circuit including a solenoid valve for controlling the disengagement of said clutch; a normally open, manually actuated switch connected in series with said pressure switch and said solenoid valve wherein said solenoid valve is energized only when both switches are closed; said solenoid valve normally permitting engagement of said clutch, but when energized assuring that said clutch is disengaged.

4,088,209

STEERING CLUTCH AND BRAKE CONTROL APPARATUS

Gary Alan Drone, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Nov. 8, 1976, Ser. No. 739,652
Int. Cl.[2] F16D *67/02*
U.S. Cl. 192—13 R **9 Claims**



1. A vehicle steering clutch and brake control system for a vehicle having independently operable left and right steering clutches and left and right brakes actuated through a single brake pedal comprising

steering means operatively connected to left and right steering clutches for selectively and independently disengaging said clutches,

brake actuating means operatively connected to left and right brakes actuable to selectively engage said brakes including a centrally pivotable bar operatively connected to a foot pedal for linear movement in response to operation of said foot pedal, a connecting rod pivotally connected at one end to said bar adjacent each end thereof and at an opposite end to one of said brakes to effect actuation thereof in response to movement of said connecting rod, and stop means supported in a position to be contacted by said centrally pivotable bar upon actuation of said inhibiting means to prevent actuation of the brake connected to the connecting rod associated therewith,

control means operatively connected to said brake actuating means and said steering means to respond to disengagement of at least one of said steering clutches for effecting selective engagement of said brakes, and

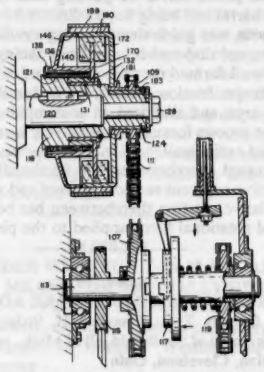
inhibiting means operatively connected to said steering means and said brake actuating means and actuable by said control means upon the selective independent disengagement of one of said clutches to inhibit the engagement of said brake on the side opposite from said disengaged clutch.

4,088,210

CLUTCHES WITH BRAKE FOR IMPLEMENTS

Stephen J. Hoff, Richmond, Ind., assignor to Hoffco, Inc., Richmond, Ind.

Filed Feb. 19, 1976, Ser. No. 659,350
Int. Cl.[2] F16D *67/02, 21/08*
U.S. Cl. 192—17 D **6 Claims**



1. A clutch assembly for the drive train of a power driven implement, comprising,

a rotary driving member comprising a hub adapted to be mounted on a shaft and having a first cylindrical portion forming a clutch face thereon,

said hub having a first reduced diameter portion adjacent said first cylindrical portion, a first driven member comprising a sleeve rotatably mounted on said first reduced portion and having a cylindrical clutch face in alignment with that on the driving member,

a helical clutch spring in clutching engagement with said clutch faces and arranged with its leading end overlying the driving member, so as to form a forward-drive clutch between the members,

a clutch release collar surrounding the clutch spring and engaged with the leading end thereof, said collar, when stopped, being operative to stop rotation of the leading end of the spring and thereby declutch the spring from the driving member,

said hub also having a second reduced portion, there being a second driven member rotatably mounted on said second reduced portion coaxially with said first driven member and including a drum,

centrifugal clutch shoes carried by said first driven member and arranged for engagement with said drum to transmit torque from the first driven member to the second driven member,

said shoes being operative on initial engagement of said spring clutch to transmit not more than a limited torque from the first driven member to the second and thereafter to transmit increased torque in response to centrifugal force.

4,088,211

OVERRUNNING ROLLER CLUTCH WITH IMPROVED CAGE AND BEARING BLOCK

John S. Doller, Sandusky, and Oscar G. Kitchin, Port Clinton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 31, 1977, Ser. No. 783,420
Int. Cl.[2] F16D *41/06*
U.S. Cl. 192—45 **5 Claims**

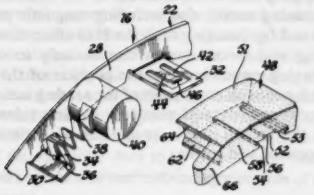
1. A unit handled roller clutch subassembly comprising:

a sheet metal cage having a single flat end ring portion elongated in a direction perpendicular to a central axis,

a plurality of circumferentially spaced, tab portions integrally connected to the end ring portion and extending in cantilevered fashion therefrom in an axial direction,

a plurality of circumferentially spaced spring retainer portions integrally connected to the end ring portion and extending in cantilevered fashion therefrom in the same axial direction, said spring retainer portions being alternated with said tab portions and circumferentially spaced therefrom,

a plurality of bearing blocks of low friction material having concentric inner and outer bearing surfaces mounted on



respective ones of said plurality of tab portions for centering inner and outer clutch races with respect to each other, each of said bearing blocks having an axial slot receiving an associated one of said tab portions for retention in the circumferential and radial directions, and

snap retention means associated with each of said axial slots for securing said bearing blocks on their associated tab portions in the axial direction, and

each of said bearing blocks having a concave face for radially retaining a roller held thereagainst and a circumferential extension spaced from said flat end ring portion for retaining such a roller in the axial direction.

4,088,212

ONE PIECE STAMPED CLUTCH HUB

William Lee Brown, Chicago, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 2, 1976, Ser. No. 720,037
Int. Cl.² F16D 3/14
U.S. Cl. 192—106.2 **10 Claims**

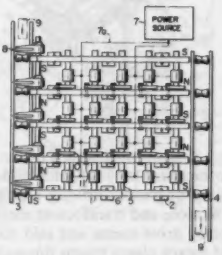
1. A one-piece stamped hub element for a clutch plate assembly having coil springs mounted between such element and its driven plate assembly, comprising a hub barrel and an integral spring-abutting flange, said barrel extending entirely from one side of the flange, said flange having spring windows receiving said coil springs, and piloting means on said flange for rotatably guiding elements of the clutch plate assembly comprising a plurality of circumferentially spaced bosses arranged in a circular path about the barrel axis and extending from at least one side of the flange closely adjacent to said barrel.

4,088,213

APPARATUS FOR TRANSPORTING CYLINDRICAL STEEL ARTICLES

Takahiro Nakamura; Yoriyuki Inoue; Tatsuo Yanagiuchi; Kazuo Houji; Takashi Yamaguchi; Wataru Furukawa, all of Wakayama; Susumu Itoh, Hitachi; Tadashi Kanaya, Hitachi; Tuneo Ichiishi, Hitachi, and Akira Osaka, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Sumitomo Metal Industries, Ltd., both of, Japan

Filed May 21, 1976, Ser. No. 688,571
Claims priority, application Japan, May 23, 1975, 50-61052; May 23, 1975, 50-61053
Int. Cl.² B65G 11/20
U.S. Cl. 193—40 **11 Claims**



1. An apparatus for transporting cylindrical steel articles comprising:

transporting means including a plurality of skid rails extending from an entrance end to an exit end of said transporting means in parallel with each other and spaced from one another and inclined for transporting thereon cylindrical articles,

means for providing a magnetic circuit which passes through at least a part of the article being transported,

exciting means for producing magnetic flux through said magnetic circuit,

control means for applying to said exciting means forward and reverse excitations, alternately, with a predetermined relationship in timing, and

a swing device including a plurality of swing members each made of magnetizable material and extending in parallel with said skid rails, each of said swing members being supported pivotably at one end for pivotal movement thereby to be allowed to cause the pivotal movement as magnetically attracted by the article being transported.

4,088,214

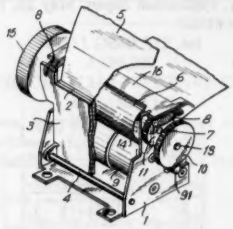
THERMALLY SENSITIVE PRINTER

Takemasa Shindo; Yoshikazu Ito, and Kenichiro Arai, all of Shiojiri, Japan, assignors to Shinshu Seiki Kabushiki Kaisha and Kabushiki Kaisha Suwa Seikosha, both of Tokyo, Japan

Filed Jul. 26, 1976, Ser. No. 708,953
Claims priority, application Japan, Jul. 25, 1975, 50-91289
Int. Cl.² B41J 3/20
U.S. Cl. 400—120 **20 Claims**

1. In a thermally sensitive printer for recording a character on a thermally sensitive medium, the improvement comprising in combination exothermic printing means including a substrate and a plurality of selectively energized resistance means supported by said substrate, said resistance means being adapted to be energized during a printing operation and thereby print characters on a thermally sensitive medium, first conductor means mounted on said substrate, said first conductor means including at least one pair of commonly referenced conductors, second conductor means mounted on said substrate and including at least one second conductor disposed intermediate each pair of commonly referenced first conductors, said plurality of selectively energized resistance means being defined by exothermic means overlying each said first

pair of conductors and second conductor disposed intermediate said pair of first conductors, said exothermic means being adapted to be energized during a printing operation to produce at least one pair of dots on said thermal sensitive medium in response to said second conductor means being selectively energized to a potential different than the potential at which said first pair of conductors are commonly referenced; rotary platen means for bringing said thermally sensitive recording means into printing contact with said resistance printing means



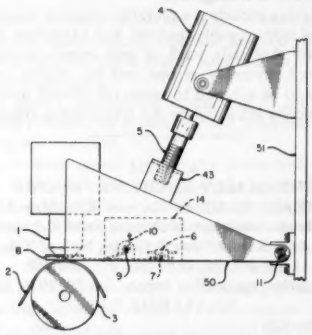
to effect printing thereby, said rotary platen means being further adapted to incrementally advance said printing medium after each printing operation; driving means for producing a rotary driving motion; and transformer means disposed intermediate said rotary drive means and said rotary platen means for rotating said rotary platen means through a predetermined pitch in response to said drive of said rotary drive means to thereby incrementally advance said thermally sensitive medium by a predetermined distance after each printing operation.

4,088,215

RECORD MEDIA COMPENSATION MEANS FOR PRINTERS

Leonhard Bader, Stadtbergen, Germany, assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 10, 1976, Ser. No. 749,590
Int. Cl.² B41J *7/92*
U.S. Cl. 400—56 **2 Claims**



1. A printing device for printing on record media which may be of different and varying thicknesses, said record media being introduced to the printing device in a given direction, comprising:

a carriage;

a carrier operatively connected to the carriage;

a frame mounted on said carrier;

a printer mounted on said frame, said printer and said carriage being capable of relative movement therebetween in a direction transverse to the direction of introduction of the record media to the printing device;

positioning means operatively connected to the frame and the carrier and including a motor capable of continuously positively positioning the frame with respect to the carrier in either of two directions so that the printer is located a predetermined distance from the record media for proper printing thereon;

circuit means including a Hall effect transducer fixed to the frame, a comparator for comparing a reference voltage with the voltage generated by the Hall effect transducer and switching means controlled by the comparator for controlling said positioning means; and

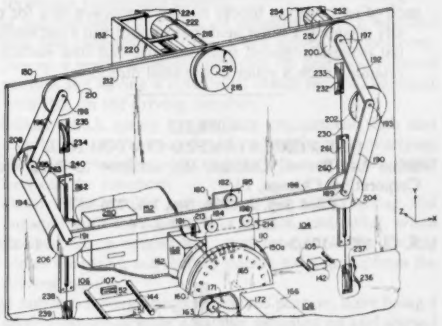
sensing means pivotally mounted between its ends on said frame and including a feeler at one end, said sensing means being biased to engage the record media and to be continuously responsive to variations in the thickness thereof, said sensing means also including magnetic means at its other end for coacting with the Hall effect transducer for causing said circuit means continuously to control the positioning means to alter the position of the printer in accordance with movement of the sensing means to maintain continuously said printer a predetermined distance from the record media regardless of variations in the thickness of said media.

4,088,216

AUTOMATIC EMBOSSING SYSTEM

Richard J. LaManna, Whippany; Jacob H. Drillick, Hawthorne, both of N.J., and Michael D. Polad, Mendota, Minn., assignors to Data Card Corporation, Minneapolis, Minn.

Filed Sep. 2, 1976, Ser. No. 720,071
Int. Cl.² B41J *1/06, 1/22*
U.S. Cl. 400—130 **24 Claims**



1. An automatic embossing system for embossing documents with characters in accordance with particular character data to be embossed on each document in a specified character location format including plural character embossing locations along each of a predetermined number of parallel, displaced embossing line locations, comprising:

an embossing station,

a plurality of character embossing elements,

movable means for mounting said plurality of embossing elements at repectively associated plural locations thereof identified by corresponding addresses of a predetermined order,

means for driving said movable means for selectively positioning said embossing elements at said embossing station in sequence in accordance with the predetermined order of said respectively associated addresses,

transport means for transporting a document to be embossed to said embossing station for selectively positioning said embossing character locations of said lines thereof at said embossing station, in a predetermined transport sequence as to said character and said line embossing locations,

means for controlling said driving means for selectively positioning said embossing elements of said movable means at said embossing station in said addess-ordered

sequence thereof and in accordance with the character data to be embossed on a given document, said controlling means further controlling said transport means for selectively positioning at said embossing station, and in said predetermined transport sequence, each character embossing location of a document to be embossed by the embossing element currently positioned at said station, in succession for all characters of the character data in accordance with said address-ordered sequence of said respectively associated embossing elements, and

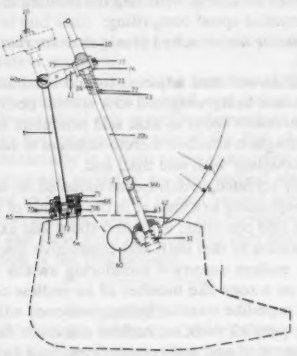
said embossing station includes means responsive to said controlling means for actuating the embossing element of said movable means currently positioned at said embossing station, to emboss the corresponding character onto said document at said character embossing location thereof currently positioned at said embossing station, for each of said character embossing locations selected to be embossed by said corresponding character in said predetermined transport sequence, and for each of said characters of the character data to be embossed in said address-ordered sequence of said embossing elements of said movable means.

4,088,217

TYPEWRITER ATTACHMENT

Ralph E. Bucknam, Crescent Beach Dr., Huntington, N.Y. 11743

Filed Feb. 3, 1977, Ser. No. 765,279
Int. Cl.² B41J *1/60*
U.S. Cl. 400—161.1 **4 Claims**



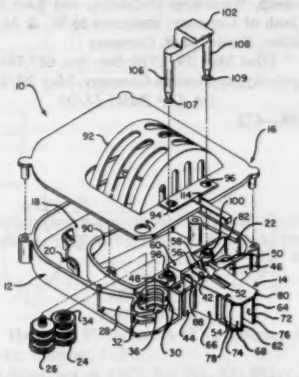
1. Apparatus for selectively changing ball-type typing elements on a single-type- element typewriter, comprising a guide means extending transversely along the top surface of the typewriter, a substantially vertical stanchion supported for movement along said guide means to a position adjacent any print position work area of said typewriter, a ball-support assembly mounted on said stanchion and free to pivot about an axis transverse to the typewriter, and a plurality of ball support members attached to said ball support assembly and each said ball support member extending radially from a central axis and rotatable thereabout, said central axis intersecting and being perpendicular to said transverse axis, whereby said ball-support assembly may be normally positioned remotely from the work area so as not to obscure or interfere with the typing operation, but any chosen ball support member may by selective rotation about said axes be moved to and from the work area for removal and replacement of the typing elements.

4,088,218

RIBBON CASSETTE WITH BI-COLOR CAPABILITY

Noel F. Depew, Wichita, Kans., assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 12, 1976, Ser. No. 731,404
Int. Cl.² B41J *33/14*
U.S. Cl. 400—208 **12 Claims**



1. A ribbon cassette comprising:

a body portion for storing a ribbon;

a support means for supporting said ribbon in an operating plane;

first means enabling said support means to pivot with respect to said body portion; and

second means connecting said support means with said body portion to selectively enable said support means to be operated in a first mode in which said support means is fixed relative to said body portion to obtain single color ribbon printing capability, and a second mode in which said support means is free to pivot via said first means to obtain bi-color ribbon printing capability;

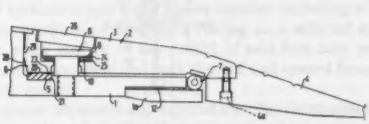
said second means being a removable member which enables said support means to be operated in said first mode when said removable member is present and which enables said support means to be operated in said second mode when said removable member is removed.

4,088,219

PASSENGER CONVEYORS

Keith Binns, Harmandsworth, England, assignor to Dunlop Limited, London, England

Filed Jun. 15, 1976, Ser. No. 696,283
Claims priority, application United Kingdom, Jun. 24, 1975, 26845/75
Int. Cl.² B66B *9/12*
U.S. Cl. 198—323 **27 Claims**



1. A comb plate device for stopping a passenger conveyor upon detection of potentially damaging condition on the conveyor comprising a longitudinally extending mounting plate for mounting transversely of a conveyor, a comb plate pivotally mounted on the mounting plate about an axis parallel to the said mounting plate and fluid-sensing means to detect pivotal movement of the comb plate away from the conveyor when in use on a conveyor said fluid-sensing means comprising

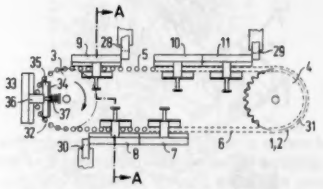
a detector positioned in a vacuum line to detect opening of an aperture in the fluid-sensing means on pivotal movement of the comb plate.

4,088,220

ENDLESS CONVEYORS FOR THE HORIZONTAL ROTARY CONVEYANCE OF OBJECTS

Bruno Jacksch, Wiesbaden-Dotzheim, and Karl Müller, Hallgarten, both of Germany, assignors to W. & M. Automation Karl Muller, Nordenstadt, Germany

Filed May 19, 1976, Ser. No. 687,709
Claims priority, application Germany, May 20, 1975, 2522299
Int. Cl.² B65G *17/00*
U.S. Cl. 198—472 **10 Claims**



1. An endless conveyor comprising an endless chain forming a loop having two substantially rectilinear portions extending between two curvilinear portions;

means for driving said endless chain; and

a plurality of carriers on said chain, each being slidably mounted on said chain and frictionally transported thereby over said rectilinear portions;

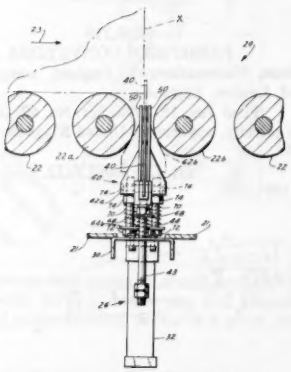
each carrier being provided with means including a spring-loaded unitary member for wedging between spaced apart links of said chain as said carrier passes from a rectilinear portion to a curvilinear portion of said chain.

4,088,221

STOP APPARATUS FOR PALLETIZERS AND THE LIKE

Robert E. Bowser, Lynchburg, Va., assignor to Simplimatic Engineering Co., Lynchburg, Va.

Filed Sep. 2, 1976, Ser. No. 719,955
Int. Cl.² B65G *47/29*
U.S. Cl. 198—491 **18 Claims**



1. In conveyor apparatus comprising

A. a series of spaced rollers defining thereover a travel path for articles; and

B. stop means comprising an article stop located adjacent and downstream with respect to one of said rollers and movable between an extended position in which said article stop extends into said travel path, thereby to obstruct passage of articles from said roller, and a retracted position in which said article stop is spaced from said travel path, thereby to permit passage of articles from said roller;

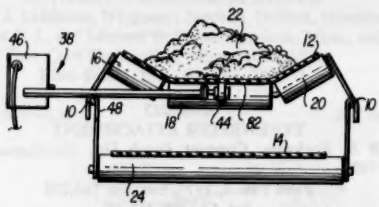
the improvement comprising a roller stop physically mounted on and connected to said stop means for movement with said article stop, said roller stop being operatively disengaged from said roller when said article stop is in said retracted position and operatively engaged with said roller when said article stop is in said extended position, thereby to inhibit rotation of said roller and thus reduce the momentum with which an article engages said article initially stop.

4,088,222

BELT SWITCH

Frank K. Hurt, Rte. 2, Box 239, North Tazewell, Va. 24630

Filed Feb. 23, 1977, Ser. No. 771,855
Int. Cl.² B65G *43/00*; H01H *35/02, 9/00*; G08B *21/00*
U.S. Cl. 198—502 **29 Claims**



9. A rotary switch for detecting the rotation of a shaft above a predetermined speed comprising:

a conductive disc attached to said shaft for rotating with said shaft;

a pendulum mounted adjacent to said conductive disc, said pendulum being weighted to a normal position but being free to rotate about an axis, said pendulum having permanent magnets attached thereto adjacent to said disc having flux coupling with said disc; and,

a gravity actuated switch means mounted on said pendulum for responding to a change in the attitude of the pendulum when said pendulum is rotated about said axis in response to rotation of said shaft and conductive disc.

22. An endless conveyor monitoring switch system to be mounted on a rope-like member of an endless conveyor support, said rope-like member being positioned adjacent to, and extending parallel with, an endless conveyor for monitoring the movement of said endless conveyor, said switch comprising:

an elongated frame;

a shaft journaled for rotation in said frame and extending longitudinally along said frame;

a drive wheel attached to and rotatable with said shaft, said drive wheel being positioned near a first end of said elongated frame;

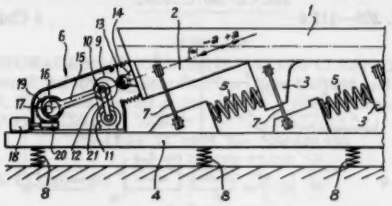
a detecting means attached to said shaft at a position along said elongated frame spaced from said drive wheel for detecting when said shaft is rotating above a predetermined velocity;

a pivotal mounting means attached to said elongated frame for mounting said elongated frame on said rope-like member running parallel to said endless conveyor for allowing said elongated frame to pivot freely about said rope-like member with the weight of said frame and its attachments causing pivoting of said frame to bring said drive wheel into continuous contact with said endless conveyor.

4,088,223
AMPLITUDE AND FREQUENCY ADJUSTABLE VIBRATION GENERATOR

Olivier Philippe Bertrand, Paris, France, assignor to Roger Brigolle, Leguillon, France

Filed Sep. 28, 1976, Ser. No. 727,561
Claims priority, application France, Oct. 1, 1975, 75 30003
Int. Cl.² B65G *27/32*
U.S. Cl. 198—761 **12 Claims**



1. A vibration generator, of which the amplitude is adjustable during operation, for driving at a predetermined angle a vibration apparatus having first and second relatively movable elements, said generator comprising:

i. a roller of resilient material mounted for free rotation on a support rigid with said first element of the vibration apparatus

ii. resilient means disposed between said first element and said second element

iii. an excitation eccentric rotatable about a shaft and positioned to abut said roller as a result of rotary oscillation along a line at said predetermined angle with respect to a longitudinal axis of said first element

iv. motor means connected through transmission means to said excitation eccentric for driving said eccentric in rotation about said shaft

v. a first arm connecting said motor means to said shaft of the excitation eccentric

vi. a second arm connected at one end to said shaft of the excitation eccentric, said second arm being positioned with its longitudinal axis at said predetermined angle with respect to the longitudinal axis of the first element and being substantially at a right angle to said first arm, and

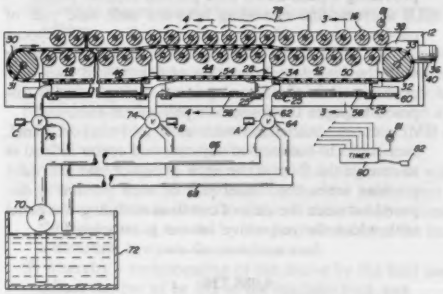
vii. control means mounted on said second element and connected to the other end of said second arm to move said second arm, and said shaft of the excitation eccentric towards and away from said roller to vary the amplitude of vibration of the first element.

4,088,224
POWERED ROLLER CONVEYOR

Gifford Kittredge, New Canaan, Conn., assignor to W & H Conveyor Systems, Inc., Carlstadt, N.J.

Filed Nov. 22, 1976, Ser. No. 743,548
Int. Cl.² B65G *13/02*
U.S. Cl. 198—783 **8 Claims**

1. A powered roller conveyor comprising a frame supporting a plurality of parallel rollers for moving a load in a first direction, means dividing said rollers into groups, selectively operable drive means for progressively rotating groups of said rollers in timed relation so that the rollers of one group of rollers commence being driven at about the time rollers of a previous group of rollers stop being driven whereby a load is caused to continuously more in said direction with the drive means only rotatably driving a discrete number of the rollers at any given time which number is substantially smaller than the total number of rollers, said selectively operable driven means including an endless belt driven by a motor so as to cause the top run of the belt to move in a direction opposite to said first direction, and a plurality of discrete elevating means along the length of said belt and controlled by a timer means forming part of said drive means for sequentially elevating a portion of the top run of the belt into frictional contact with the rollers of

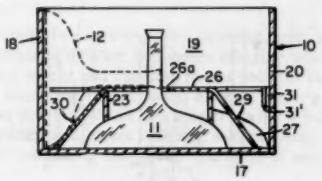


one of said roller groups in a manner so that discrete groups of rollers are progressively driven in said first direction.

4,088,225
PACKAGE

Freeman H. Hartnell, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sep. 9, 1977, Ser. No. 831,959
Int. Cl.² B65D *85/42*
U.S. Cl. 206—419 **4 Claims**



1. In combination with a carton or container for packaging a plurality of five funnel-neck portions for television picture tubes, such carton having a rectangular bottom with a sidewall extending vertically from each of the edges thereof and said tube portions to be positioned therein with the seal edge of the funnel of a first of such portions resting on said bottom of the carton generally at the center thereof and with the remaining four tube portions positioned about said first tube portion with the seal edge of the funnel of each of such four portions respectively disposed adjacent a different one of said sides of said carton, the necks of each of such four portions respectively extending generally horizontally past each of four points separated approximately ninety degrees about the periphery of the neck of said first tube portion and spaced from such portion, a paperboard separator and support assembly for said tube portions, such assembly comprising;

(A) a vertical support and spacer member including a lower edge conforming to and for resting on a selected area of the outer surface of the funnel of said first tube portion while surrounding the neck thereof and spaced from such neck; and,

(B) a planar separator and support member for resting on the upper edge of said vertical support and spacer member, such planar member having a generally rectangular configuration for fitting inside said carton parallel with said bottom thereof and embodying,

(I) a center hole for receipt therethrough of the neck of said first tube portion,

(II) a pair of cut-lines extending from each edge of the planar member and generally curving inwardly towards each other from adjacent each respective edge to outline the configuration of part of the outer surface of a

funnel of one of said four tube portions, the planar member material between each said pair of cut-lines providing a push-down tube portion support panel,

(III) a crease-line extending between each said pair of cut-lines to provide for each respective said support panel a hinge means located so as to generally coincide with the funnel-neck junction of one of said four tube portions when the funnel part of such portion is disposed between the respective pair of cut-lines, and

(IV) a cut-out associated with each said support panel, each such cut-out located adjacent said center hole so as to receive the flare of the neck of one of said four tube portions when the funnel part of such portion is disposed between the pair of cut-lines outlining the panel with which the respective cut-out is associated.

4,088,226

PORTABLE FACILITIES FOR AUTOMATICALLY COLLECTING AND SORTING WOUND SPOOLS FROM OPEN-END SPINNING MACHINES

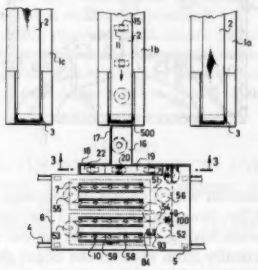
Karel Vlček, Okres Trutnov; Zdena Pacáková, Cerveny Kostelec; Bohuslav Jirka, Upice; Bedřich Česenek, Okres Nachod, and Karel Jindra, Cerveny Kostelec, all of Czechoslovakia, assignors to Elitex, koncern textilního strojirenstvi, Liberec, Czechoslovakia

Filed Sep. 16, 1976, Ser. No. 723,939

Claims priority, application Czechoslovakia, Sep. 22, 1975, 6374-75

Int. Cl.² B07C 5/04

U.S. Cl. 209—82 **10 Claims**



1. In a portable arrangement for collecting and automatically sorting wound spools from an open-end spinning machine having an exit point for successively discharging the wound spools, the arrangement comprising, in combination, a main housing supported for movement past the exit point, an entry chute affixed to the housing for receiving the successive spools from the exit point, the entry chute having a lower guiding edge against which an outer periphery of each received spool bears during movement thereof to the outlet end of the entry chute, first conveying means supported in the housing, an auxiliary magazine supported in the housing, classifying means disposed opposite the outlet end of the entry chute for directing spools having a wound diameter less than a predetermined value to the auxiliary magazine and for directing the remaining spools onto the first conveying means, an auxiliary support floor movably carried in the housing, a plurality of spool-receiving receptacles extending upwardly in horizontally spaced relation from the auxiliary support floor in a prescribed regular pattern, second conveying means movably supported in the housing for horizontal movement in a first path extending successively past the upper ends of the receptacles, means interposed in the housing between the first and second conveying means for successively transferring spools from the first conveying means onto spaced points of the second conveying means, and means individually associated with the receptacles and disposed in the path of movement of the second conveying means for successively releasing spools carried on the spaced portions of the second conveying means onto successive ones of the underlying receptacles.

4,088,227

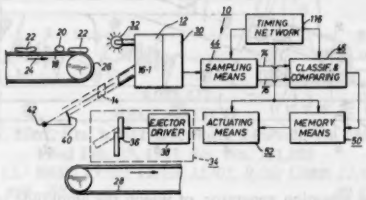
MULTIPLEXED SORTING APPARATUS WITH TEST CIRCUITRY

James F. Lockett, Houston, Tex., assignor to Geosource Inc., Houston, Tex.

Filed Jul. 12, 1976, Ser. No. 704,652

Int. Cl.² B07C 5/342

U.S. Cl. 209—111.6 **6 Claims**



1. In a sorting apparatus having a time division multiplexer providing a plurality of multiplex times to multiplex a plurality of first and second electrical signals each generated from a plurality of signal generators associated with a corresponding plurality of viewer elements, means for generating an electrical classification signal functionally related to the ratio of said first and second electrical signals, a test circuit comprising:

means for isolating one of said electrical signals at a predetermined point within said sorting apparatus;

means for enabling said isolating means at a predetermined multiplex time;

means for holding said sampled electrical signal for a period of time sufficient for said multiplexer to step through the other of said plurality of multiplex times and return to said predetermined multiplex time; and

means for displaying said held signal.

4,088,228

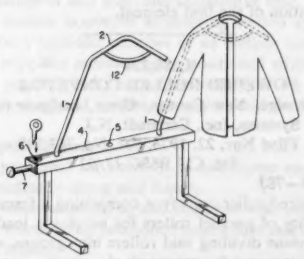
CLOTHES STAND

Ingemar Schwalbe, 9 St. Eriksgatan, Stockholm, Sweden (S-112 39)

Filed Dec. 22, 1975, Ser. No. 643,605

Int. Cl.² E05B 73/00

U.S. Cl. 211—4 **4 Claims**



1. A clothes stand for supporting clothing articles having a sleeve, comprising a holder having a horizontal hollow portion with an upper wall, said upper wall having an aperture therein, a latch bolt slidably mounted in said hollow portion below said aperture, a hanger for supporting the clothing article having an upper arcuate horizontal portion, said upper arcuate horizontal portion terminating at one end in a downwardly extending vertical leg having a length approximately equal to the length of the sleeve of the supported article of clothing, the upper arcuate horizontal portion having a projecting member inter-

mediate its ends enlarging the dimension of said upper portion such that it is larger than the internal dimension of the sleeve to prevent passage of the sleeve thereover, the lower end of said leg being received in said aperture in said upper wall and having a reduced portion received in said hollow portion and engagable with said latch bolt, the latch bolt being so arranged that in at least one position it permits insertion of said leg into said hollow portion and said reduced portion of said leg being engaged by the latch bolt in a second position of said latch bolt to prevent removal of said leg from said holder.

4,088,229

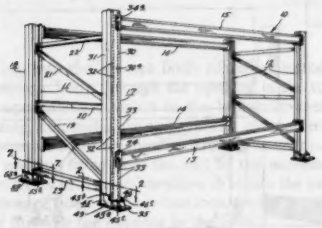
STORAGE RACK COLUMNS HAVING CLEAN-OUTS

Peter H. Jacoby, Perkasie; Carl Gary Seiz, Hatfield, and Robert J. Egner, Dublin, all of Pa., assignors to Seiz Corporation, Perkasie, Pa.

Filed Oct. 24, 1975, Ser. No. 625,533

Int. Cl.² A47B *57/04*

U.S. Cl. 211—191 **9 Claims**



1. In combination with a storage rack including at least one upright having flange means providing a hollow interior having a longitudinal axis, said flange means having a series of axially-spaced apertures therein for adjustably mounting load supports at various levels, the improvement comprising: a base plate extending across the bottom of said upright, means providing a lower edge on said flange means adjacent the bottom of said upright, horizontally-separated means projecting upwardly from said base plate for spacing said lower edge from said base plate and cooperating therewith to form a clean-out opening disposed transversely to said axis and affording access into the interior of said upright at the base of said upright, a pair of gusset plates extending upwardly from said base plate and engaging along said upright laterally of said clean-out opening, said gusset plates having rear flanges partially inturned around the rear of said upright and having front flanges extending frontward of said upright and tapering toward a common corner in front of said clean-out opening for cooperating with the base plate to channel the flow of cleaning medium through the clean-out opening and into and out of the interior of the upright, and means welding said gusset plates to said upright and said base plate, whereby foreign matter which may enter the interior of the upright through the apertures may be removed through the clean-out opening.

4,088,230

CONTROL MEANS FOR A BAR HOLDER AND FEEDER COUPLED TO AN AUTOMATIC MACHINE TOOL

Ewart H. Doe, Houghton, and William J. Linforth, Chandlers Ford, both of England, assignors to Twyford Moors (Aircraft & Engineering) Ltd., England

Filed Jul. 29, 1975, Ser. No. 600,122

Claims priority, application United Kingdom, Aug. 19, 1974, 36397/74

Int. Cl.² B23Q *5/22*

U.S. Cl. 214—1.2 **8 Claims**

1. In combination, control means for an elongated bar holder and a bar feeder for an automatic machine tool to hold bars for and feed bars to the machine tool:

(a) said elongated bar holder being aligned with the machine tool, which bar holder can be opened to allow bar to be loaded thereinto;

(b) loading means to load bar into a loaded position in the bar holder;

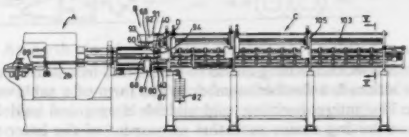
(c) said bar feeder being positioned between the elongated bar holder and the machine tool, through an open collet of which machine tool bar is to be fed from the bar holder;

(d) said bar feeder comprising a sleeve engageable over a bar to be fed at a position externally of the machine tool and feed means to cause axial movement of the sleeve;

(e) the sleeve having internal biased gripping means which permit the sleeve to be moved by the feed means over the bar in a direction away from the machine tool but prevent the sleeve being moved by the feed means over the bar in a direction towards the machine tool;

(f) whereby a reciprocating of the sleeve by the feed means causes the bar to be fed to the machine tool; and

(g) means to prevent movement of the bar from the loaded position in a direction away from the machine tool to enable the sleeve initially to be pressed over the end of the bar nearer the machine tool,



(h) said control means comprising counting means settable to a determined number; trip means effective when in a set position to trip said counting means once for each workpiece machined; trigger means to move said trip means to said set position when a new length of a bar is fed into said bar holder; and means coupling said counting means to means controlling machining operation of said machine tool;

(i) said determined number being settable so that, after a number of workpieces equal to said determined number have been machined from a length of bar preceding said new length of bar, such that the remnant of said length of bar is not of sufficient length safely to permit machining of a further workpiece therefrom, said counting means stop operation of said machine tool and cause said feed means of said bar holder and feeder to eject said remnant through said collet of said machine tool, by feeding the forward end of said new length of bar through said collet, and

(j) means to release said trip means from said set position upon ejection of said remnant from said bar holder.

4,088,231

APPARATUS FOR REPOSITIONING BALES ON A BALE WAGON

Randall E. Zipser, Fresno; Gene R. Butler, Kingsburg, and Donald M. Grey, Selma, all of Calif., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Aug. 23, 1976, Ser. No. 716,913

Int. Cl.² B65G *57/32*

U.S. Cl. 214—6 B **4 Claims**

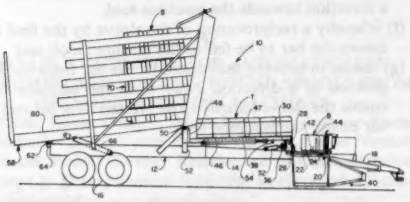
1. In a bale wagon having means for accumulating bales into a tier including a bale-supporting surface with at least one opening therein defining a generally linear path, and means disposed at a first position for receiving bales and movable to a second position for transferring bales to said bale-accumulating means, an improved apparatus for repositioning selected bales on said bale-accumulating means, said improved apparatus comprising:

bale engaging means including a frame mounted for sliding movement along said path and below said bale-supporting surface of said bale-accumulating means and at least one element mounted on and extending upwardly from said

frame and through said opening to above said bale-supporting surface to where said element will engage a bale overlying said opening and move the same along said path of movement of said frame to reposition said bale;

means mounting said bale-engaging means for movement relative to said bale accumulating means for repositioning at least one selected bale thereon; and

means for moving said bale-engaging means along said path including yieldable means in the form of a spring or the like mounted below said bale-supporting surface of said bale-accumulating means and interconnected to said slidable frame so as to bias the same and thereby said at least one element mounted thereon toward the location on said



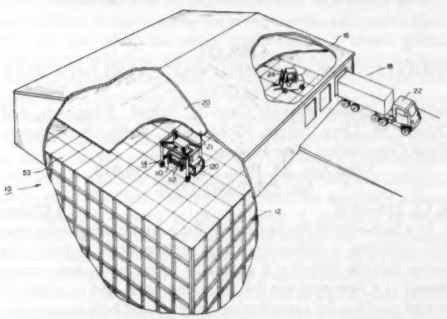
bale-accumulating means to where said bale is to be repositioned, a flexible member in the form of a cable or the like interconnecting said slidable frame and said bale-receiving means such that movement of the latter from said first to said second position in transferring bales to said bale-accumulating means pulls said slidable frame away from said location against said biasing of said yieldable means, while movement of said bale-receiving means from said second position back to said first position after transferring bales to said bale-accumulating means releases the pull on said slidable frame and thereby concurrently allows said yieldable means to cause said slidable frame to move back toward said location.

4,088,232

APPARATUS WITH STORAGE CELLS DISPOSED ADJACENT VERTICAL SHAFTS HAVING COVERS AND A LIFT MEANS MOVABLE THEREABOVE

George E. Lilly, South Bend, Ind., assignor to Clark Equipment Co., Buchanan, Mich.

Filed Apr. 1, 1974, Ser. No. 457,100
Int. Cl.[2] B65G *1/06*
U.S. Cl. 214—16.4 A **7 Claims**



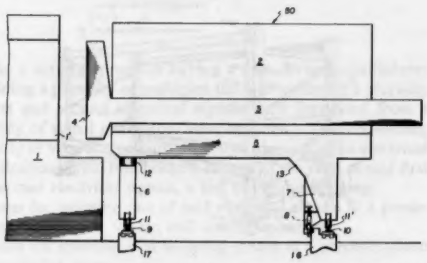
1. A product and material storage system comprising a storage structure having a plurality of spaced vertical shafts with blocks of storage cells disposed on at least three sides of the shaft and arranged in vertical tiers of two or more separate cells for receiving and storing individual loads, said cells being directly and separately accessible from the respective adjacent shaft, a floor above said storage structure, a top cover for each of said shafts on substantially the same plane as said floor, lift means including a carriage and movable above said floor from one shaft to another with a load, said carriage including means for moving a load suspended thereby laterally into and from a cell along a shaft.

4,088,233

DEVICE FOR PUSHING INCANDESCENT COKE OUT OF THE OVEN CHAMBERS OF HORIZONTAL COKE OVEN BATTERIES

Johannes Knappstein, and Manfred Strobel, both of Recklinghausen, Germany, assignors to Firma Carl Still Recklinghausen, Germany

Filed May 23, 1977, Ser. No. 799,602
Int. Cl.[2] C10B *33/10*; F23K *3/00*; B65G *25/04*
U.S. Cl. 214—23 **4 Claims**



1. A device for pushing incandescent coke out of individual chambers of a coke oven battery having a plurality of horizontally arranged coke oven chambers, comprising, a trackway of spaced apart inboard and outboard tracks and supports therefor extending along the length of the coke oven battery, a gantry-like carriage including a platform support portion with inboard leg means on the side of said carriage which is adjacent the coke oven battery and having inboard wheel means thereon engaged on the inboard one of said tracks, said platform support portion further having outboard leg means on the side of said carriage remote from the coke oven battery with outboard wheel means engaged on the outboard one of said tracks, flexible connection means connecting said inboard leg means to said platform support portion, rigid connection means connecting said outboard leg means to said platform support portion, ram means carried on said carriage being movable into and out of the individual coke oven chambers of the battery, and a contact pressure mechanism connected between said outboard leg means and said outboard track supports for transmitting horizontal forces from said carriage to said track supports during operation of said ram means.

4,088,234

FRONT END LOADER

Fred T. Smith, Newark, Ohio, assignor to Sargent Industries, Inc., Century City, Calif.

Division of Ser. No. 497,129, Aug. 12, 1974, Pat. No. 3,988,979.
This application Aug. 5, 1976, Ser. No. 711,876
Int. Cl.[2] B60P *1/00*
U.S. Cl. 214—83.3 **2 Claims**

1. In combination in a refuse loader,

a refuse storage body having a roof and having an opening in the roof,

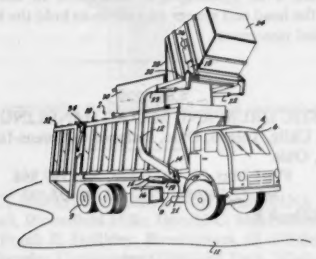
a pair of doors movable to open and close the opening in the roof,

means for supporting the doors on the opposite sides of the opening for pivotable movement between a horizontal

position closing the opening and a vertical position exposing the opening,

hydraulic means operatively coupled to the support means for providing a movement of the doors between the horizontal and vertical positions,

means operatively coupled to the hydraulic means for providing a first positive force on the doors during the movement of the doors to the horizontal position to provide a



packing into the storage body of refuse introduced into the storage body through the opening in the roof, and

means operatively coupled to the hydraulic means for increasing, automatically and without manual intervention, the positive force on the doors to a greater force than the first positive force near the end of the movement of the doors to the horiziontal position to insure the packing into the storage body of the refuse introduced into the storage body through the opening in the roof.

4,088,235

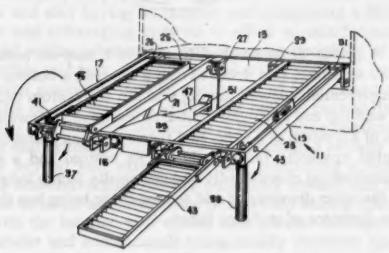
DEMOUNTABLE RAMP STRUCTURE FOR DUMP TRUCKS AND SIMILAR VEHICLES

Howard E. Thacker, 41875 Osgood Rd., Fremont, Calif. 94538

Filed Jul. 23, 1976, Ser. No. 708,018

Int. Cl.² B65G *67/02*

U.S. Cl. 214—85 **11 Claims**



1. A ramp structure for trucks having beds of a size for hauling auxiliary vehicles comprising,

a rigid framework having forward, rearward and lateral sides, and having a first pair of parallel ramp members of equal length extending from the forward to the rearward sides of said framework and spaced spart a distance equal to the tire separation distance of auxiliary vehicles,

a second pair of spaced apart, parallel ramp members of equal length, each in communication with one of said first pair of ramp members near the rearward side of said framework for coming into alignment with said first pair of ramp members in one position and overlapping said first pair in another position,

means connected to said framework for detachably coupling said framework to a truck body, and

bracing means extending between said framework and the truck body for steadying said framework against the truck body when said framework is coupled thereto, whereby said framework is coupled to and braced against a truck body for movement therewith.

4,088,236

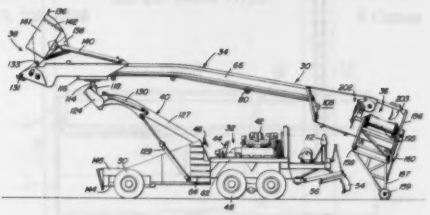
MULTIPLE USE EARTH WORKING MACHINE

Emanuel M. Moore, Pine Bluff, Ark., assignor to B. B. and M. Inc., Pine Bluff, Ark., a part interest

Filed Jun. 17, 1977, Ser. No. 807,810

Int. Cl.² B65G *47/02*; E02F *3/76*

U.S. Cl. 214—90 R **12 Claims**



1. An earth working machine comprising a mobile frame, a longitudinally extending conveyor supported from said frame, a transverse conveyor suported from the rearward end of said frame and being rigid with respect to the longitudinal conveyor, and an earth engaging means mounted on the forward end of the longitudinal conveyor for depositing earth, or the like, onto the longitudinal conveyor for movement rearwardly on the longitudinal conveyor onto the transverse conveyor for movement laterally of the machine, each of said conveyors including an endless belt supported by rollers defining the upper flight of the belt into a trough-like configuration, said longitudinal conveyor including means thereon supportingly engaging the frame at longitudinally spaced points with the rearward support means being in the form of a downwardly facing plate engaging a support surface on the frame in a manner to permit free upward movement of the rearward end portion of the longitudinal conveyor in relation to the frame, the forward support means including subframe interconnecting the longitudinal conveyor and the frame for vertical swinging movement to raise and lower the forward end portion of the longitudinal conveyor, said subframe including a laterally movable detachably engaged connecting means engaged with the longitudinal conveyor to enable vertical elevation of the forward end portion of the longitudinal conveyor and detachment of the longitudinal conveyor from the subframe thereby enabling the longitudinal conveyor to be readily disengaged from the subframe and frame to enable the mobile frame and subframe to be utilized for multiple purposes.

4,088,237

STORAGE AND RETRIEVAL SYSTEM

William L. Brown, Easton, Pa., assignor to SI Handling Systems, Inc., Easton, Pa.

Filed Sep. 27, 1976, Ser. No. 726,897

Int. Cl.² B65G *43/00*

U.S. Cl. 214—152 **5 Claims**

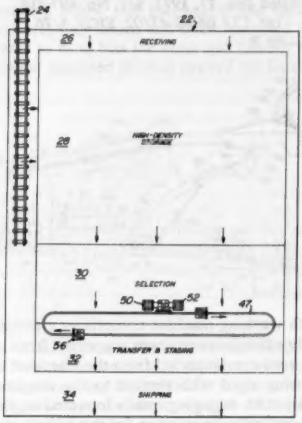
1. A method of storing goods in a warehouse and removing selected ones of said goods for shipment comprising:

(a) transferring goods in the form of a pallet load from a receiving area to a specific location in a high density storage area in response to a computer command and then communicating to a computer that the transfer has been performed, storing the identity and location of said goods in the memory bank of the computer,

(b) moving some of said goods in the form of a pallet load from said specific location to one of a plurality of endless conveyors in response to a computer command and then communicating to the computer that the move has been

performed, storing the identity and location of the moved goods in the memory bank of the computer,

(c) selecting a particular quantity of specific goods off said endless conveyors in response to a computer command then communicating to the computer that the selection has been performed, storing the identity of the selected goods and the identified location on said conveyors in the memory bank of the computer,



(d) placing the selected goods directly on a pallet at said selecting area, and

(e) moving the pallet as loaded in accordance with step (d) to a shipping area by means of an endless vehicle conveyor and by a command from the computer, whereby the goods are only handled once from pallet to pallet at said selecting area, and

(f) dispatching said loaded pallets at said shipping area.

4,088,238

FRAME CONTAINER FOR PRESSURE VESSELS

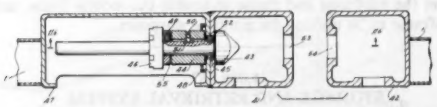
Ernst Berwald, Bergkamen-Heil, and Volker Asbeck, Unna, both of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Jul. 13, 1976, Ser. No. 704,835

Claims priority, application Germany, Jul. 16, 1975, 2531681; Jan. 28, 1976, 2603073

Int. Cl.[2] **B65D** *87/00;* **B66C** *1/00;* **B62D** *23/00*

U.S. Cl. 220—1.5 **3 Claims**



1. A frame container for pressure vessels comprising a polygonal frame defining an interior space for receiving a pressure vessel therein; said frame having a plurality of corners and including standard ISO corner mountings on at least some of said corners; and means mounted in said frame adjacent at least some of the ISO corner mountings for securing its associated corner mounting to an ISO corner mounting on another container; said corner mountings having oval openings therein and said means including an elongated bolt slidably mounted in said frame and its associated corner mounting for longitudinal movement therein between frame coupled and frame decoupled positions; said bolt including an oval shaped head having a flat rear surface being normally located within its associated corner mounting in the frame decoupled position of the bolt, a pair of spaced oval guide rings mounted thereon, and an oval spacer ring mounted thereon between said guide rings; a nut mounted on said bolt adjacent the guide ring removed from the head to hold the rings in closely assembled relation to the head; said oval head and rings being arranged in the decoupled position of the bolt such that the major axis of said oval head and the major axis of the spacer ring are transverse to the major axis of the oval opening in their associated ISO corner mounting through which the bolt extends, and the major axis of the oval guide ring adjacent the head is parallel to the major axis of said oval opening and is located in that opening, whereby the head and spacer ring serve to hold the bolt against longitudinal movement.

4,088,239

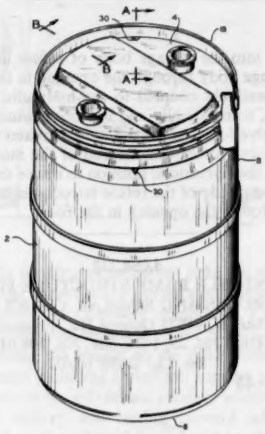
PLASTIC DRUM AND METAL HANDLING RING

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed May 23, 1977, Ser. No. 799,866

Int. Cl.[2] **B65D** *7/02, 25/28, 25/00*

U.S. Cl. 220—5 R **9 Claims**



1. A plastic drum adapted to receive a snap-on metal ring carrier structure, said drum having a top end, a bottom end, a circumferential sidewall joining said top and bottom ends, and near said top end a circumferential recess in said sidewall in the form of a frustum of a cone, said recess defining a first circumferential upwardly facing ledge at its bottom and a second circumferential downwardly and outwardly facing ledge at its top, the outer diameter of said second ledge being less than the outer diameter of said first ledge.

4,088,240

FUEL TANK LEAKAGE FIBER FLOW SEALANT

Anthony San Miguel, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 13, 1976, Ser. No. 722,995

Int. Cl.[2] **B65D** *25/14, 25/34*

U.S. Cl. 220—452 **7 Claims**

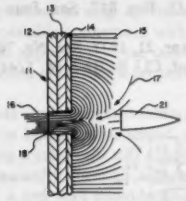
1. A self-sealing tank wall comprising:

a liquid impervious wall which is susceptible to puncture, and which has inner and outer surfaces for defining a liquid enclosure;

sealing means attached to said inner surface of said liquid impervious wall for providing flowable sealant to the vicinity of a puncture in said liquid impervious wall; and

a carpet-like liner attached to said sealing means, said liner having an interwoven configuration comprising elongated

non-self-adherent fibers, and having said fibers individually extending from said liner, and said extending fibers



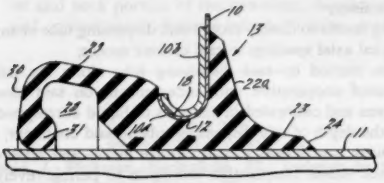
being responsive to flow of said liqiud through said puncture.

4,088,241

IMPACT RESISTANT SEAL FOR GASOLINE TANK

John F. Hall, Bloomfield Hills; Donald C. MacDonald, Rochester, and Frank R. Holliday, Birmingham, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 19, 1976, Ser. No. 715,962
Int. Cl.[2] B65D *25/20*
U.S. Cl. 220—86 R 11 Claims



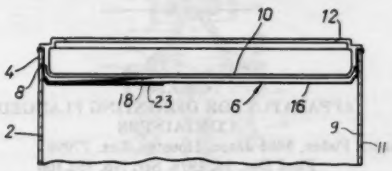
1. An impact resistant seal comprising a tubular body of resiliently deformable material for use between a portion of an automobile gasoline tank around an opening therein and a filler tube extending into said tank through said opening, said tubular body having a passage therethrough of variable diameter along its axis and also having an interior end comprising a flexible tubular seal converging endwise to effect an interference fit and fluid sealing relationship with the outer periphery of said tube within said tank, the outer periphery of said body having an annular groove defined by axially spaced interior and exterior sides of said groove and opening radially outwardly for receiving said tank portion therein in fluid sealing relationship around said opening, said interior side extending radially outwardly beyond said exterior side and comprising a flexible annular seal converging radially outwardly toward said exterior side to effect an interference fit and fluid sealing relationship with the interior wall of said tank around said opening, said tubular and annular seals being readily yieldable against said tube and said interior wall respectively when subject to the fluid pressure in said tank, thereby to increase said sealing relationship as said fluid pressure increases, the radial thickness of said tubular body at the region of said groove being greater than the axial thickness of said annular seal throughout the major radial extent of the latter, the axial thickness of said annular seal being comparable to the radial thickness of said tubular seal, and means for effecting an interference fit and sealing relationship between said tubular body and the outer periphery of said tube at the region of said groove and for concentrating the compressive force of said tube against said body opposite the base of said groove and cooperating with said flexible tubular and annular seals for enabling appreciable cocking of said tube out of alignment with the axis of said passage without impairing said sealing relationship when said body and tube are assembled together comprising the diameter of said passage being smaller than the diameter of the outer periphery of said tube throughout the axial extent of said groove and being a minimum at a location spaced axially between said sides of said groove and increasing in opposite axial directions at least to the axial locations of said sides.

4,088,242

THIN METAL FOIL MEMBRANE CAN CLOSURE HAVING AN EASY-OPEN SCORELINE

Walter Schellenberg, Diepoldsau, Switzerland, assignor to Max Sandherr AG, Switzerland

Filed Jan. 18, 1977, Ser. No. 760,324
Claims priority, application Switzerland, May 7, 1976, 5776/76
Int. Cl.[2] B65D *51/22*
U.S. Cl. 220—258 9 Claims



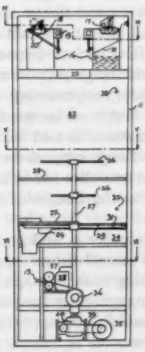
1. A can closure comprising
a thin metal foil membrane extending across and sealing the can opening in a plane parallel to the can end, said membrane having a thickness of between about .050 and 0.10 mm. and having a pull-off tab thereon;
means in said membrane defining a desired separating line, said
means including a groove-like constriction of diminished thickness,
said membrane including an area extending generally parallel to said constriction and inclined relative to the plane of said membrane,
the diameter of said inclined area being smaller than the diameter of said constriction; and
a removable protective lid extending across said can opening outwardly of said thin metal foil membrane.

4,088,243

ICE MAKING AND VENDING MACHINES

Maxwell Ivan Deveson, 82 Albert Street, Mordialloc, 3195, Victoria, Australia

Filed Sep. 28, 1976, Ser. No. 727,530
Int. Cl.[2] B65H *17/04*
U.S. Cl. 221—93 8 Claims



1. An ice making and vending machine comprising at least one ice making unit sitting on a tiltable tray which when activated tilts or tips and allows ice from the ice making unit to be delivered into an insulated storage cylinder below, the storage

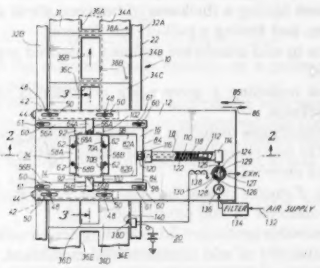
cylinder having an outlet for ice on its base, the outlet having a first plate thereover to prevent ice from falling freely through the outlet, a motor driven spindle supporting for rotation a second plate extending across the cylinder adjacent its base and having an open sector therein, a number of radial paddles which rotate with the spindle at the base of the cylinder below both said plates to sweep ice from the open sector in the second plate into the outlet, and upper and lower control bars in said storage cylinder, said control bars being of a suitable metal the measurement of the resistance of which provides indication as to whether said bars are or are not surrounded by ice, and thus the extent to which said cylinder is filled with ice.

4,088,244

APPARATUS FOR DE-NESTING FLANGED CONTAINERS

Samuel Fisher, 5466 Jason, Houston, Tex. 77096

Filed Dec. 16, 1976, Ser. No. 751,100
Int. Cl.[2] B65G *59/00*
U.S. Cl. 221—299 **12 Claims**



1. Apparatus for separating the lowermost flanged container from a nested stack of flanged containers, said apparatus comprising:

a baseplate having an opening therein sized to permit the lowermost container to pass therethrough;

a flange support member rectilinearly movable from a first to a second position, said flange support member having first and second rectilinearly spaced flange support surfaces thereon, said second flange support surface being rectilinearly behind and above said first flange support surface, a flange-lifting surface disposed intermediate said first and said second flange support surfaces; and,

means for rectilinearly reciprocating said flange support member from said first to said second rectilinear position;

said flange support member in said first rectilinear position disposing said first flange support surface in adjacency to said opening in said baseplate and in a supporting relationship with respect to the flanges of the lowermost container;

said flange support member in said second rectilinear position disposing said second flange support surface in adjacency to said opening in said baseplate;

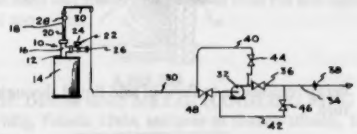
said lifting surface engaging the flanges on the next-lowermost container as said flange support member moves from said first to said second rectilinear position to lift the next-lowermost container onto said second flange support surface and into a supported relationship therewith as said first flange support surface is withdrawn from its supporting relationship with respect to the flanges on the lowermost container.

4,088,245

PESTICIDE DISPENSER WITH CALIBRATED TUBULAR OUTLET PROBE

Leonard Brown, P.O. Box 817, San Juan Capistrano, Calif. 92675

Filed Apr. 21, 1977, Ser. No. 789,425
Int. Cl.[2] B67D *5/08, 5/44*
U.S. Cl. 222—41 **5 Claims**



1. A device for the positive control of liquid dispensed from a container having an aperture in a wall thereof which comprises:

aperture closure means having a through passageway and mounting means for removable and sealed attachment of said closure means to said container with said through passageway communicating with said aperture;

a liquid dispensing tube slidably received in said through passageway to extend through said aperture into said container;

sealing means to fixedly secure said dispensing tube at any of varied axial spacings in said closure means;

indicia carried by said dispensing tube along the length thereof cooperative with index means on said closure means and calibrated in amounts of liquid corresponding to the depth of said dispensing tube in said container; and

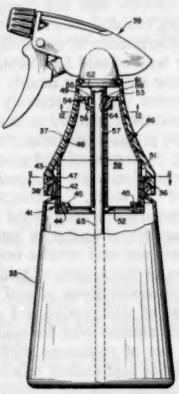
container vent means in said closure means and reversible check means cooperative therewith to permit reversing adjustment between venting into and out of said container.

4,088,246

CAPSULE AND CONTAINER THEREFOR

Richard James Klingaman, Darien, Conn., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 571,886, Apr. 25, 1975, Pat. No. 3,966,089. This application Mar. 11, 1976, Ser. No. 665,758
The portion of the term of this patent subsequent to Jun. 29, 1993, has been disclaimed.
Int. Cl.[2] B67B *7/24*
U.S. Cl. 222—88 **8 Claims**



1. A package for diluting and dispensing in diluted form a concentrated substance comprising in combination,

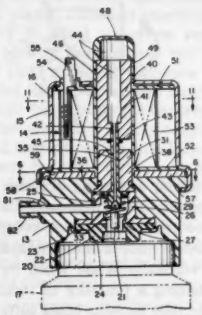
a. a hollow container having a neck portion terminating in an annular rim,
b. a closure cap having an inner threaded surface,
c. said neck portion having an outer threaded surface adapted for rotatable connection with said inner threaded surface of said cap to mount the cap on said container,
d. a cradle disposed in said neck portion below said annular rim,
e. a sealed capsule containing said substance mounted on said cradle with its bottom wall seated on said cradle, said capsule having a relatively stiff shape retaining side wall projecting upwardly through said neck portion within said cap and a top wall provided with coupling formations,
f. puncturing means on said cradle projecting from said cradle toward said annular rim and terminating below said open end,
g. downwardly extending coupling formations within said cap adapted to engage said coupling formations on the capsule as the cap is rotated while being mounted on said container, and
h. dispensing means disposed in said closure cap for expelling the contents of said container,
i. said puncturing means being adapted to pierce the bottom wall of said capsule as the capsule is displaced in response to downward movement and rotation of said closure cap on said neck portion of the container, thereby releasing said concentrated substance into said hollow container.

4,088,247

ENGINE STARTING AID

Ronald J. Hickman, Springfield, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill.

Filed Nov. 24, 1975, Ser. No. 634,664
Int. Cl.² F02M *1/16*
U.S. Cl. 222—180 **15 Claims**



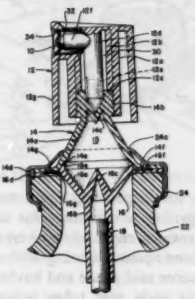
14. An engine starting aid for dispensing fluid from a can, comprising; a housing having an aperture therein for receiving the can containing fluid to be dispensed, a plunger mounted for movement in said housing to actuate the can for dispensing, an armature slidable in a guide for moving the plunger, a coil assembly surrounding the armature carried by said housing, said coil assembly including a plate defining a portion of the flux path of the coil assembly, bracket means for the entire assembly formed integrally with the plate, a member positionable below the can for urging the can upwardly into the aperture in said housing, said member having a first position below the can when the starting aid is in normal use, said member having a second position engaging the housing and covering said aperture during transit.

4,088,248

SPRAYER-DISPENSER PUMPS

William S. Blake, 10231 Bellehurst, Westminster, Calif. 92683

Filed Jul. 22, 1976, Ser. No. 708,954
Int. Cl.² B65D *37/00*
U.S. Cl. 222—207 **18 Claims**



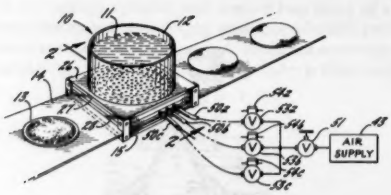
1. A dispenser pump comprising:
a flexible bulb defining a pump chamber, said bulb being formed by an upper section and a lower section, each having an outwardly extending flange which is to engage the upper open end of a container with a portion of said lower bulb section extending into said container, said lower section including a depending tubular portion adapted to connect to a dip tube to extend into the container, said lower section further including integrally formed and upwardly extending flap means at the upper end of said tubular portion, said flap means mating together to form a normally closed one-way check valve which will open in response to reduced pressure within said chamber to suck fluid from said container into said chamber but will prevent flow from the chamber into the container, said upper bulb section including a pair of integrally formed flaps which extend downwardly toward said chamber and define a normally closed check valve which is urged to close by pressure in said chamber but permits flow out of said chamber when said flaps are forced apart, said upper section including a tubular portion surrounding said upper valve, said tubular portion having a cylindrical exterior and having relatively thick walls forming a pressure pad;
a dispenser head including a cylindrical portion which fits onto said bulb upper section cylindrical portion and having a surface engaging the upper end of said cylindrical portion which forms said pressure pad, said dispenser head including a bayonet valve stem having its lower end shaped to fit within the tubular portion of said upper bulb section and adapted to engage the flaps forming said upper valve and open said upper valve flaps when said dispenser head is pressed against said pressure pad with sufficient force to compress said bulb and create a predetermined pressure in said chamber that will cause said pressure pad to be compressed enough to permit said valve stem to separate said upper valve flaps, said valve stem having means defining a passage to connect said chamber to a dispenser orifice within said head; and
means for clamping said bulb flanges on the upper end of said container, and means formed within said flanges for permitting air to enter said container to replace product sucked into said chamber.

4,088,249

LIQUID DISPENSING MACHINE

Donald E. Westling, c/o Tilleys Pizza House, 902 4th St., Beloit, Wis. 53511

Filed Oct. 18, 1976, Ser. No. 733,248
Int. Cl.[2] B67D *3/00*
U.S. Cl. 222—486 **1 Claim**



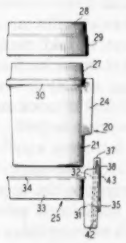
1. Apparatus for dispensing liquid sauce or the like, said apparatus comprising a container for said sauce, inner and outer annular rows of angularly spaced upright tubes having upper end portions communicating with the lower end of said container to receive said sauce and having lower end portions with open lower ends, said tubes being made of resiliently flexible material, a first enclosure defining an inner chamber receiving the intermediate portions of the tubes in said inner row, a second enclosure defining an outer chamber receiving the intermediate portions of the tubes in said outer row, said inner chamber being sealed from said outer chamber, means for admitting pressure fluid into said chambers to squeeze the intermediate portions of said tubes together to retain said sauce in the upper portions of said tubes, said means being selectively operable to release the pressure fluid from either both of said chambers or only from said inner chamber thereby to enable the intermediate portions of the tubes of both rows or the intermediate portions of only the tubes of said inner row to flex open and dispense said sauce.

4,088,250

INSULATING CONTAINER CARRIER AND ADAPTOR

Donald J. Schaefer, 3127 Greenbriar Dr., Glenview, Ill. 60025

Filed Apr. 12, 1976, Ser. No. 676,532
Int. Cl.[2] A45F *3/16, 5/00*
U.S. Cl. 224—5 W **18 Claims**



1. In a container carrier comprising an assembly of an insulating receptacle adapted to receive and enclose a container holding hot or cold contents to be kept at substantially a desired temperature for an extended length of time, and a separable adaptor for mounting the carrier on a support:

said receptacle including a generally cup-shaped open-topped body formed from insulating foam plastic material and providing an upwardly opening container-receiving chamber of substantial axial as well as radial dimensions;

an external generally radially extending and axially elongate reinforcing lug handle of substantial length integral with said receptacle body and having its upper end near the top of said body such that when said carrier is manipulated by means of said lug handle the center of gravity is substantially lower than said upper end of said lug handle;

said adaptor having an axially elongate body portion provided with an axially extending recess shaped substantially complementary to said lug handle for embracingly engaging said lug handle of said receptacle;

the upper part of said adaptor body portion connected to a collar for encircling an upper portion of said receptacle body;

said receptacle body and said adaptor having complementary surfaces cooperating to maintain the receptacle and adaptor assembly with the center of gravity of the receptacle body and any contents therein substantially below said collar;

said adaptor body portion extending in engagement with the upper and lower portions of said lug handle and providing a lateral stabilizing relation between the receptacle and the adaptor especially when the receptacle carries the weight of a filled container;

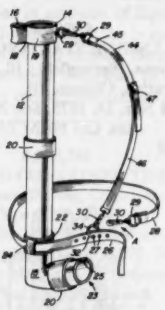
and means carried by said adaptor body portion for supported attaching of the adaptor selectively to belt-like and bracket type supports.

4,088,251

TENNIS BALL DEVICE

Ernesto Rodriguez, 304 Eden Dr., Longview, Tex. 75601

Filed Nov. 26, 1976, Ser. No. 745,479
Int. Cl.[2] A45C *11/00*
U.S. Cl. 224—5 D **9 Claims**



1. A device for storing a quantity of tennis balls and dispensing said balls sequentially on demand of a user, the device being adapted to be worn by the user, comprising:

an elongated hollow tube member adapted to be disposed substantially vertically when worn by a user, the tube member containing a plurality of tennis balls, the inner diameter of the tube member being sufficiently larger than the diameter of the balls to allow movement of said balls longitudinally through said tube member;

a tubular projection disposed at the lower end of the elongated hollow tube member, the longitudinal axis of the tubular projection forming an angle of less than 90 degrees with the longitudinal axis of the tube member, the tubular projection having an elliptical opening formed at the distal end thereof, the elliptical opening having a minor axis of a length slightly less than the diameter of each of the balls contained within the tube member, the balls being sequentially displaced into the tubular projection for removal through the elliptical opening on tilting of the lower end of the tube member to downwardly dispose said opening; and,

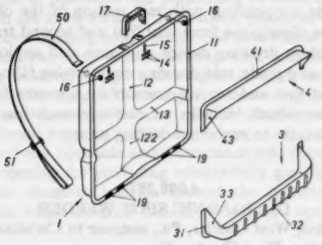
means for releasably attaching the tube member to the body of the user.

4,088,252

SCHOOL BOOK BACK SATCHEL

Arno Grunberger, Neubaugasse 4/13, 1070 Vienna, Austria

Filed Mar. 10, 1976, Ser. No. 665,483
Claims priority, application Austria, Mar. 19, 1975, 2131/75
Int. Cl.[2] A45F 3/00
U.S. Cl. 224—8 R 8 Claims



1. A school book back carried satchel comprising:

a substantially light weight plastic back wall shell including integral sidewalls extending continuously about the periphery of the back wall and defining with the back wall a rectangular bag back pocket facing outwardly on one side of said back wall, said shell being curved concavely in a transverse direction on the other side of said shell back wall, opposite said pocket, to fit the body of the user,

at least one bag member of a soft pliable light weight material, and

means for mounting said at least one bag member to said one side and partially within said bag back pocket to protect said soft, pliable light weight material bag and its contents about the edges of said bag, said plastic shell further comprising a vertical, central groove extending over the entire vertical height of the plastic shell on the other side of the back wall to accomodate the full lumbar contour of the user and to define a vertical ventilation path between the user and the shell extending the full vertical height of said shell, and a groove extending transversely over the entire width of said plastic shell and intersecting said vertical, central groove to affect transverse ventilation air flow between the back of the user and said plastic shell, and wherein said shell sidewalls terminate in flanged edges and said satchel further comprises a rigid molded plastic bottom member having complementary flange edges to that of said shell and being fixedly coupled to said shell at the lower end thereof on the side facing away from the back of the user by way of said complementary flanges, and wherein said rigid molded plastic bottom member includes laterally spaced, upwardly extending side projecton portions to define with said shell sidewalls an enlarged bottom pocket acting in conjunction with the back pocket of said shell for receiving and further protecting the bag member and its contents.

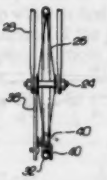
4,088,253

RACK FOR BICYCLES

Robert Saffold, 1401 Kenwood Rd., Santa Barbara, Calif. 93109

Division of Ser. No. 397,890, Sep. 17, 1973, Pat. No. 3,972,456.
This application Jul. 30, 1976, Ser. No. 710,037
Int. Cl.[2] B60R 9/10
U.S. Cl. 224—42.03 B 5 Claims

1. A rack for carrying a bicycle on a vehicle comprising: a pair of bars, each bar having an upper part provided with a notch at its uppermost end for receiving the axle of a respective one of the wheels of the bicycle with the notch being positionable between the bicycle frame and the respective wheel, each bar further having a lower part and an arm shiftably mounted on the lower part to form therewith a wheel confining space for receiving the lower portion of a bicycle wheel therebetween to limit movement of the wheel transversely of its plane when the axle of the wheel is received in the notch of the corresponding bar; means coupled with the bars for securing the same to a vehicle in respective, spaced upright positions with said bars being laterally spaced from each other by a distance corresponding substantially to the wheel base of the bicycle; and means attachable to the frame of



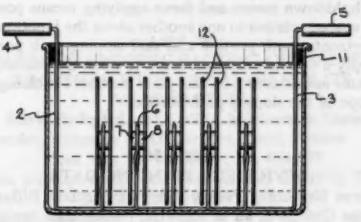
a bicycle intermediate the axles thereof for coupling the frame to a vehicle to limit movement of the frame relative to the vehicle when the bars are secured thereto, when the axles of the bicycle are received by respective notches, and when the lower portions of the wheels of the bicycle are in the wheel confining spaces.

4,088,254

MAGNETIC HOLDING APPARATUS AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Joel Ray Hooper, 2658 Tipsico Lake, Milford, Mich. 48042

Filed Dec. 8, 1976, Ser. No. 748,458
Int. Cl.[2] B65D 69/00
U.S. Cl. 224—45 R 10 Claims



1. An apparatus for holding magnetizable articles comprising:

a portable frame member;

said frame member including an upwardly extending arm portion disposed at each end thereof and an intermediate portion having a plurality of spaced apart support legs, each support leg extending upwardly from the intermediate portion and having a free extending end;

each of said support legs having at least one permanent magnet mounted proximal to the free extending end thereof so as to hold said magnetizable articles in a spaced apart relation;

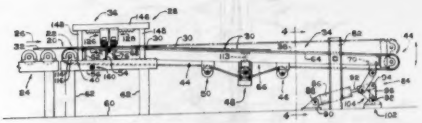
each said magnet being adapted to hold each said article adjacent a predetermined portion of said article to permit a peripheral portion of said article to extend freely in a manner permitting each said article to be grasped adjacent said peripheral portion for individual removal of each said article from said apparatus; and

said frame member being adapted to be placed in a fluid carrying pot with said arm portions extending upwardly from said pot and said intermediate portion with said support legs being disposed interiorly of said pot.

4,088,255
APPARATUS FOR OPENING LATERAL SCORES IN MOVING GLASS SHEETS

Robert P. DeTorre, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 29, 1976, Ser. No. 736,963
Int. Cl.² C03B *33/02*
U.S. Cl. 225—98 **7 Claims**

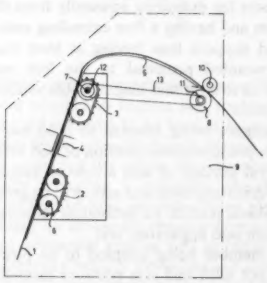


1. An apparatus for opening scores in a fracturable material, comprising:
- a horizontal plate having a first end and an opposed second end;
- a plate member having a first end and an opposed second end;
- hinge means secured adjacent the first end of said plate and the first end of said plate member;
- an endless belt;
- means for mounting said endless belt about said plate and said plate member;
- means acting on said endless belt for moving said belt along an article movement path having a receiving horizontal path portion when said belt moves over said horizontal plate and a downwardly sloping portion when said belt moves over said plate member;
- holddown means mounted transverse and above said receiving horizontal path portion adjacent said downwardly sloping path portion;
- force applying means mounted transverse and above said downwardly sloping path portion;
- said holddown means and force applying means positioned in spaced relation to one another about the junction of said horizontal path portion and said sloping path portion to apply a bending moment force to open the scores; and
- elevator means acting on said plate member for changing the slope of the sloping path portion.

4,088,256
DEVICE FOR PRINTING DATA

Theodorus Gerhardus Potma; Egbertus Nicolaas Bijkerk, and Marius Quirijnen, all of Rijswijk, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 502,955, Sep. 4, 1974, abandoned. This application Nov. 12, 1976, Ser. No. 741,233
Claims priority, application Netherlands, Sep. 18, 1973, 7312807
Int. Cl.² B65H *17/42*
U.S. Cl. 226—74 **9 Claims**

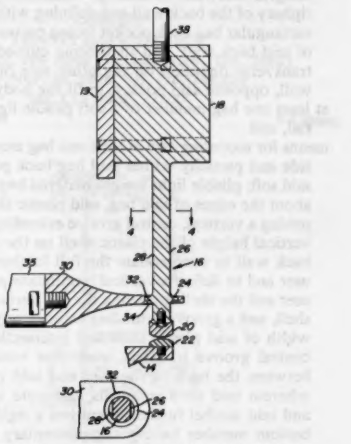


1. A device for printing data on an associated chart which includes a first perforation track on one side of said chart and a second perforation track on the other side of said chart, said device comprising: means for printing, and means for moving the associated chart which includes a first tractor engaging a section of the chart at said first perforation track and a second tractor engaging said section at said second track, said first and second tractors cooperating with the chart to advance the chart responsive to rotation of said first and second tractors, a paper guide cooperating with said section of the chart after said section disengages from said first and second tractors, at least one chart drawing device engaging said section of said chart after said guide, said drawing device being (1) coupled to one of said first and second tractors by a means for power transmission which includes an elastic element and (2) not coupled directly to any other driving means.

4,088,257
ULTRASONIC SPOT WELDER

Janet Devine, West Chester, Pa., assignor to Christiana Metals Corporation, West Chester, Pa.

Filed Feb. 14, 1977, Ser. No. 768,458
Int. Cl.² B23K *1/06, 5/20*
U.S. Cl. 228—110 **10 Claims**



1. In a non-fusion welder provided with a reed resonant in a flexural mode having a circular flange intermediate its ends, said flange being bonded to a resonant coupler member having its longitudinal axis generally perpendicular to the longitudinal axis of said reed, the improvement comprising said reed having a non-circular cross section except at said flange so as to have a major transverse dimension and a minor transverse dimension, with the major transverse dimension being generally perpendicular to the longitudinal axis of said coupler member.

4,088,258
APPARATUS AND METHOD FOR VACUUM HOT PRESS JOINING, COMPACTING AND TREATING OF MATERIALS

John A. Regalbuto, Fort Worth, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.

Division of Ser. No. 430,857, Jan. 4, 1974, Pat. No. 3,971,875. This application Jul. 16, 1976, Ser. No. 706,032
Int. Cl.² B23K *19/00*
U.S. Cl. 228—193 **11 Claims**

1. Vacuum hot press apparatus for subjecting materials to high levels of mechanical force while maintaining such materials in a heated, high vacuum environment comprising:

a. an open bed press device having opposed pressure apply-

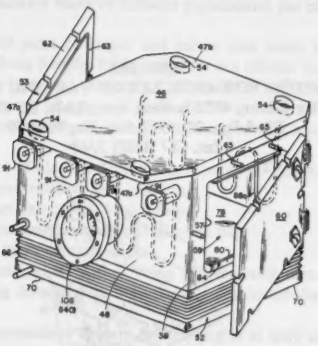
ing and receiving platen means for applying pressure to a workpiece therebetween;

b. a permanently reusable, easily openable and closeable furnace chamber having a dimensionally changeable exterior wall operatively positioned between said platen means;

c. said chamber having a large interior work receiving space relative to the exterior dimensions thereof and providing for ease of operation and positioning of materials therein which are to be formed, compacted, joined or treated;

d. an access opening means positioned in a vertical portion of said exterior wall communicating with said interior and being relatively large with respect to said vertical wall portion for ease of inserting and removing workpieces into and from the interior of said chamber while it is positioned between said press platens;

e. operatively openable and closeable access door means at said opening for providing substantially gas tight sealing of the chamber interior around the materials placed therein when the door is secured over said opening;



f. means operatively connected with said chamber interior providing for producing a chemical reaction inhibiting environment within the interior of said chamber;

g. heating means in said chamber for applying heat to materials placed therein;

h. said dimensionally changeable exterior wall containing dimensionally stable and dimensionally non-stable exterior wall sections to provide for a portion of said exterior wall to be moved during use towards an opposite portion of the chamber wall so that externally applied pressing forces can be transmitted through said wall to a workpiece in said chamber;

i. whereby compressive force may be applied to materials in said chamber interior in a substantially even distribution of pressure across said materials by means of forcible inward movement of said chamber moveable wall portion when pressed inward by movement of one of the press platens against the exterior of said chamber.

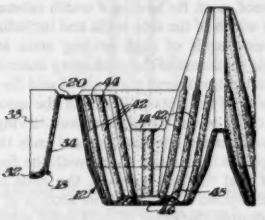
4,088,259

DIE-DRIED MOLDED PULP EGG CARTON

John T. Sutton, Belgrade, Me., assignor to Keyes Fibre Company, Waterville, Me.

Filed Nov. 8, 1977, Ser. No. 849,550
Int. Cl.[2] B65D *1/24*
U.S. Cl. 229—2.5 EC **10 Claims**

1. An egg carton molded of fibrous pulp material having a pocketed bottom formed to provide a plurality of downwardly dished egg pockets with a vertical depth at least as great as one-half the length of an egg of the size which the carton is dimensioned to accommodate, and a closeable cover integrally hinged to the pocketed bottom for folding between a closed position overlying the egg pockets and an open position which permits a like empty carton to be nested therein in a stack of such cartons, the improvement being characterized in that the closeable cover has compact thickness, rigid firmness, densified hardness and detectable surface qualities obtained by being simultaneously dried and finish-formed between mating heated pressing molds, the outer surface of the closeable cover having a smooth feel and appearance as produced by being finish-formed with a smoothly polished, heated metal pressing surface, and in that the pocketed bottom has egg holding and protecting qualities comparable to such qualities as are obtained with molded pulp which is first suction molded and then oven dried, the inner surface of the pocketed bottom having egg holding and protecting portions protruding from thinner



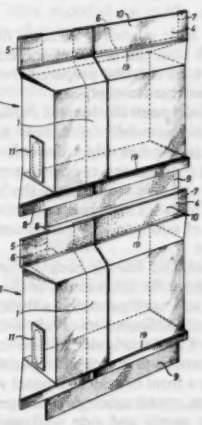
supporting side wall portions, the thinner side wall portions of the inner surface having compact thickness, rigid firmness, and densified hardness qualities obtained by being simultaneously dried and finish-formed between mating heated pressing molds but the egg holding and protecting portions of the inner surface having non-compacted consistency, resilient softness, and an irregular fibrous feel and appearance as produced by being dried in a free space without finish-forming pressure, the protruding egg holding and protecting portions being formed and arranged to provide cushioning areas within each egg pocket to support an egg of the size which the carton is dimensioned to accommodate.

4,088,260

PARALLELEPIPEDIC PACKING CONTAINER TOGETHER WITH A METHOD FOR ITS MANUFACTURE

Olof S. Stark, Rydsgård, and Kjell H. Mårtensson, Malmö, both of Sweden, assignors to AB Ziristor, Lund, Sweden

Filed May 24, 1976, Ser. No. 688,997
Claims priority, application Sweden, May 29, 1975, 7506126
Int. Cl.[2] B65D *5/72, 31/12*
U.S. Cl. 229—17 R **4 Claims**



1. A parallelepipedic packing container formed from a tube

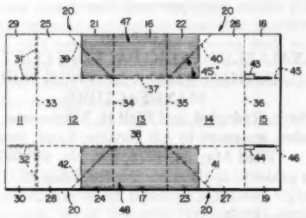
of packaging material in which the tube is filled with the desired contents and is then divided into individual interconnected containers by transversely sealing the walls of the tube in face-to-face relation at spaced zones longitudinally of the tube, each zone including a pair of spaced transverse seals and an unsealed portion therebetween, shaping the individual containers into a parallelepipedic form and finally separating the packages one from another by severing the transverse sealing zones between the pairs of transverse seals thereof to form sealing fins along opposed side walls of each container and triangular portions extending beyond the side walls at the top and bottom of each container, said container comprising a parallelepipedic body, sealing fins disposed along two opposite side walls thereof, each fin having a width substantially equal to one-half the width of the side walls and including one of the pair of transverse seals of each sealing zone and a fin-like portion of single thickness of the packaging material projecting from the associated transverse seal, one of said fin-like portions terminating short of the opposed ends of the associated transverse seal, the other of said fin-like portions having a section of single thickness intermediate the opposed ends thereof which section corresponds in size and shape with the fin-like portion of said one of said fin-like portions, the ends of said other fin-like portion beyond the ends of the section of single thickness having a double thickness of packaging material, each of said fin-like portions being folded against and sealed to the associated side wall whereby the stiffness of the side walls of the container is increased to resist buckling when the container is handled.

4,088,261

CONTAINER FOR TRASH COMPACTOR

Edward L. Osborne, Kansas City, Kans., assignor to Westvaco Corporation, New York, N.Y.

Filed Apr. 6, 1977, Ser. No. 785,105
Int. Cl.[2] B65D 5/24
U.S. Cl. 229—26 **1 Claim**



1. A bellows style container wherein the depth of the container is greater than the width of the container for use in a trash compactor or the like prepared from a single blank of corrugated paperboard comprising:

(a) a substantially centrally located rectangular bottom panel with foldably attached front, rear and side wall panels connected to the free edges thereof;

(b) a plurality of corner connecting panels between said front, rear and side wall panels, the intersecting edges of which are foldably attached respectively to the adjacent free edges of said side wall panels and said front and rear wall panels;

(c) a diagonal fold line in each corner connecting panel extending from the intersection of the foldable attachment between a side wall panel and a front and rear wall panel to a free edge thereof to divide the corner connecting panels into a first triangular section foldably attached to a side wall panel and a second trapezoidal section foldably attached to a front or rear wall panel wherein a liquid tight web corner construction is achieved when the corner connecting panels and side wall panels are folded such that the respective trapezoidal sections thereof form the inner and outer sides of the container by sandwiching therebetween the respective side wall and attached triangular sections and the horizontal edges of the corner connecting panel triangular sections become aligned with the horizontal edge of their attached side wall and the horizontal edges of the corner connecting panel trapezoidal sections become aligned with one another and disposed above the horizontal edges of said triangular sections and side walls;

(d) a plurality of top closure panels foldably attached to the remaining free edges of said front and rear wall panels and to the free edges of said trapezoidal sections attached to said rear wall panel; and,

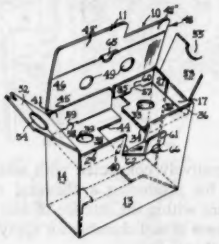
(e) means for retaining the top closure panel attached to said rear wall and the adjacent top closure panels attached to said trapezoidal sections in upstanding relation until said container is filled.

4,088,262

CARTON FOR ARTICLES OF VARYING SIZES

Bert O. Kuehlhorn, 4925 Indiana Ave., Lisle, Ill. 60532

Filed Jun. 22, 1977, Ser. No. 809,079
Int. Cl.[2] B65D 5/48
U.S. Cl. 229—27 **4 Claims**



1. A shipping and handling carton for articles of varying sizes constructed from a sheet of blank material formed to provide an open-top carton comprising

a. rectangularly arranged bottom, end and side walls secured together to form a normally open-top carton,

b. a cover extending from one side wall and adapted to close the normally open top of the carton,

c. latch means provided by the other side wall cooperating with means on said cover for releasably latching said cover in a closed position,

d. partition members extending from said other side wall and connected thereto by a fold line about which said members are hingedly disposed within said carton, said members comprising separate panels each providing depending wall portions adapted to have facial abutment with the inner wall surfaces of said side walls, and a medial portion between said side walls and extending at right angles thereto, with the wall portions of one of said partition members being of a length greater than the length of the other wall portion of said other partition member so as to dispose the medial portion thereof in a different plane transversely between said side walls,

e. article - securing means formed in said portions of said partition members for independently securing articles of different heights within said carton, and

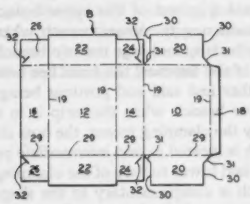
f. means provided by said portions cooperating with means provided by said one side wall for retaining said portions in their transverse plain between said side walls.

4,088,263

SEAL END CARTON CORNER CONSTRUCTION

Louis C. Michetti, Santa Clara, Calif., assignor to Container Corporation of America, Chicago, Ill.

Filed Jul. 11, 1977, Ser. No. 814,200
Int. Cl.² B65D 5/02
U.S. Cl. 229—37 R 2 Claims



1. In an infestation proof, collapsible, seal end folding carton formed of a unitary blank of foldable paperboard, the combination of:

(a) opposed pairs of major and minor side walls foldably joined along parallel fold lines to form a tubular structure;

(b) closure means at one end of said tubular structure comprising a set of opposed pairs of closure flaps foldably joined to end edges of respective major and minor side walls;

(c) each set of closure flaps being secured to each other in overlapped relation and including:

(i) at least one inner closure flap;

(ii) at least one intermediate closure flap;

(iii) one outer closure flap;

(d) said outer closure flap being substantially rectangular and being co-extensive with the end of said tubular structure;

(e) said intermediate closure flap having at at least one side thereof a recess which exposes an upper surface of said inner flap and which has an edge portion extending from an inner corner of said intermediate flap along a line which forms an angle of less than 90° with the fold line joining said intermediate flap to its respective side wall;

(f) said inner closure flap having therein a cut extending from a point spaced a slight distance from the inner corner of said inner flap adjacent said intermediate panel and underlying said related edge portion of said intermediate panel recess to facilitate deflection of said inner panel and thereby provide a substantially flat plane between the upper surfaces of the portions of the inner and intermediate flaps which contact the lower surface of the outer flap.

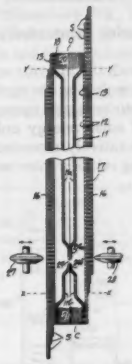
4,088,264

MULTIWALL POUCH BAGS FOR DETACHED PACKAGING OF COMMODITIES

Russell C. Vogt, Pensacola, Fla., assignor to St. Regis Paper Company, New York, N.Y.

Filed Sep. 3, 1976, Ser. No. 720,360
Int. Cl.² B65D 33/02
U.S. Cl. 229—55 8 Claims

1. A bag of tubular form consisting essentially in the combination of: a pair of inner and outer tubes of, respectively, heat sealable and non-heat sealable materials in wall thicknesses adapted for heat sealing said inner tube to closure through said outer tube and severing said inner tube thereat by creasing said outer tube, said tubes being bonded together at opposite ends thereof but being otherwise detached, said inner tube being heat sealed to closure over a zone adjacent one end thereof and severed thereat to form an upper portion heat sealed to closure at its base and a detached lower portion bonded to said outer tube, the outer said tube being closed below said zone at said end, the opposite bonded ends of said tube being open but adapted for closure by heat sealing said inner tube to closure



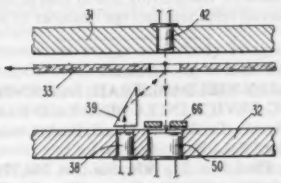
over a zone adjacent said end and severing thereat and thence closing the outer said tube above said zone.

4,088,265

ADAPTABLE MARK/HOLE SENSING ARRANGEMENT FOR CARD READER APPARATUS

John S. Garczynski, Norristown, Pa., assignor to Peripheral Dynamics, Inc., Norristown, Pa.

Filed May 26, 1976, Ser. No. 690,264
Int. Cl.² G06K 7/10
U.S. Cl. 235—454 20 Claims



1. In a card reader adapted to operate in a plurality of reading modes for reading information encoded on cards transported therethrough, a reading assembly comprising:

a. read means for generating first data signals in optical form representative of data encoded on cards, and having a plurality of modes of operation;

b. transducer means for converting said first data signals to an electrical form, said transducer means having a plurality of modes of operation corresponding to said modes of operation of said read means, said transducer means having a common output circuit with a single output; and

c. mode selection means operable on both said read means and said transducer means to provide for at least three different modes of reading.

4,088,266

METHOD AND APPARATUS FOR COLLECTING, STORING AND TRANSMITTING SOLAR HEAT

John H. Keyes, Nederland, Colo., assignor to International Solarthermics Corporation, Nederland, Colo.

Filed Jun. 24, 1976, Ser. No. 699,529
Int. Cl.² F24J 3/02
U.S. Cl. 237—1 A 26 Claims

1. An apparatus for generating heat from solar energy to heat a building comprising:

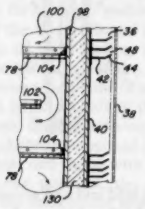
a housing separate from the building and having at least one wall oriented in a substantially vertical position and at

least one other wall in any position in substantially 90° increments relative to the vertical wall,

a storage chamber defind substantially by the interior of said housing,

heat retaining material substantially filling said storage chamber,

means coextensive with the exterior surface of a plurality of said housing walls including the vertical wall for converting solar energy into heat, said converting means comprising a plurality of solar energy collecting and trapping plate members operatively mounted in spaced-apart and outward protruding relation from said housing walls, each



of the plate members comprises an inner plate portion extending away from said housing walls and an outer plate portion extending at an obtuse angle from the inner plate portion, each pair of adjacent plate members collectively defining a substantially horizontal and parallel channel over said converting means, said plurality of plate members providing heat within the channels,

first means for transferring heat from the channels of said converting means to said storage chamber,

said heat retaining material being responsive to transferred heat for storing heat, and

second means for transferring stored heat in said heat retaining material from said storage chamber to said building.

4,088,267

ELASTICALLY YIELDABLE RAIL FASTENER AND RAIL FIXING DEVICE INCLUDING SAID FASTENER

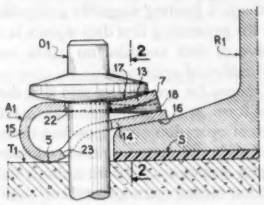
Michel Duchemin, Lambres les Douai, France, assignor to Ressorts du Nord S.A., Paris, France

Filed Nov. 24, 1976, Ser. No. 744,771

Claims priority, application France, Nov. 26, 1975, 75 36208

Int. Cl.[2] E01B *9/30, 9/48*

U.S. Cl. 238—349 **8 Claims**



1. An elastically yieldable fastener for fastening a rail to a support for the rail, comprising in combination an elastically yieldable strip bent onto itself and including two branches of substantially the same length disposed one above the other and a curved portion interconnecting the branches, the branches extending longitudinally from said curved portion to free ends of the branches and each branch defining an aperture, and clamping means having a shank extending through the apertures and upper means defining a lower surface, an upper branch of said branches having substantially the same thickness throughout the upper branch and comprising an intermediate portion longitudinally extending from said curved portion to said free end of the upper branch and two lateral portions which are located on opposite sides of said intermediate portion and extend longitudinally of the upper branch substantially from a plane containing centers of said apertures to said free end of the upper branch and extend downwardly toward the lower branch of said branches from said intermediate portion and define with said intermediate portion an open-ended boss which is arch-shaped in transverse planes of the upper branch and has the open end adjacent said free end of the upper branch, the lateral portions each having an end portion which is adjacent said free end of the upper branch and is solely capable of contacting the lower branch when said clamping means clamp the strip and urge the two branches toward each other in use of the fastener, the branches being further apart from each other and said end portions being out of contact with the lower branch when the strip is in a free state and unclamped by the clamping means, the boss defining an upper surface which is located in said intermediate portion and is for contact with said lower surface of the clamping means and has a shape which is complementary to the shape of said lower surface in a region of said lower surface extending longitudinally of the upper branch substantially from said plane toward said free end of the upper branch substantially to an outermost edge of said lower surface when said end portions of the lateral portions are in contact with the lower branch, said intermediate portion of the upper branch being in spaced relation to the lower branch when said end portions of the lateral portions are in contact with the lower branch.

4,088,268

ELECTROSTATIC SPRAY GUN FOR POWDERED MATERIAL

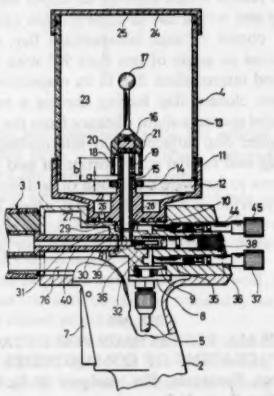
Gerhard Friedrich Vöhringer, Friedrichshafen, Germany, assignor to Elektrostatische-Spritz-und Beflockungsgesellschaft G.F. Vohringer GmbH, Oberteuringen-Neuhaus, Germany

Filed Mar. 26, 1976, Ser. No. 670,976

Claims priority, application Germany, Mar. 29, 1975, 2514160

Int. Cl.[2] B05B *5/00*

U.S. Cl. 239—15 **13 Claims**



1. An electrostatic spray gun for powdered material comprising, in combination, a common housing; separate connections for supplying powder and compressed gas; intake means for introducing the powdered material to a conveying gas stream; a spray tube; a spray nozzle; a charging device for electrostatically charging the powder; an injector; said connections for the powder and compressed gas supply and said injector being held in said common housing portion; supply channels for powder and conveying gas from said respective connections to said injector; a metering gas channel leading from the compressed gas connection to the powder supply channel; a control valve in each said metering gas channel and said conveying gas channel; powder magazine means with a connection on said housing; connection means for supplying a

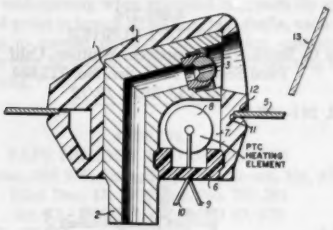
loosening gas to said magazine means and connected to said compressed air connection through a passage in said housing; and an auxiliary control valve in said connection means for supplying said loosening gas; a gas-permeable partition of porous material dividing said magazine means into an upper and a lower magazine space, said lower space communicating with the line for supplying loosening gas; an adjustable control valve in said supply line for said loosening gas; and a suction line with gradient for connecting the upper space of said magazine means with said injector; said suction line being spaced above said partition and having at least one lateral intake opening.

4,088,269

ELECTRICALLY HEATED WINDSHIELD WASHER SPRAY NOZZLE ASSEMBLY

Horst Schlick, Schwalback, Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Germany

Filed Nov. 6, 1975, Ser. No. 595,326
Int. Cl.[2] B60S *1/52;* H05B *1/00;* B67D *5/62;* B05B *1/24*
U.S. Cl. 239—133 **1 Claim**



1. The combination with the windshield of a motor vehicle, of a spray nozzle assembly mounted upon the vehicle in position to direct a fluid spray onto said windshield said spray nozzle assembly comprising:

a hollow angled pipe having a fluid inlet and a terminal portion at its respective ends,

a spray nozzle mounted in said terminal portion,

housing means enclosing said pipe and mounting the same on the vehicle such that the fluid spray from said spray nozzle is directed onto the exterior surface of the windshield;

a PTC heating element mounted in said housing means, contiguous to and in heat exchange relation with said nozzle and said pipe;

said housing means forming a chamber with a downwardly-facing opening beneath the nozzle,

said heating element being positioned within said chamber,

a closure element removably fixed in said housing and closing said downwardly-facing opening,

said housing being formed of heat-insulating thermoplastic material and is circumferentially grooved for releasable engagement with the rim of an opening in the hood of the vehicle,

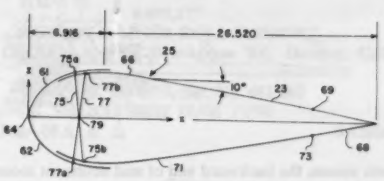
said heating element having its temperature-resistance curve rising sharply at or about 0° C with its steepest portion below 50° C.

4,088,270

TWO DIMENSIONAL WEDGE/TRANSLATING SHROUD NOZZLE

Donald L. Maiden, Williamsburg, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 31, 1976, Ser. No. 672,221
Int. Cl.[2] B64C *15/06*
U.S. Cl. 239—265.25 **5 Claims**



1. An improved nozzle for use with jet propelled aircraft comprising:

an essentially rectangular exterior nozzle housing having a top wall, a bottom wall and two side walls,

said top and bottom walls of said housing terminating in a mutually transverse plane and said two side walls tapering to a point extending beyond the top and bottom walls to thereby form an exit for said nozzle;

a nozzle throat area adjacent the nozzle exit;

a two-dimensional wedge centerbody having a symmetrical aerodynamic exterior configuration and disposed in said nozzle exit and secured to said side walls of said housing,

said nozzle housing having an internal section configuration that provides a gradual change from a circular duct area to an essentially rectangular section at the nozzle throat and exit plane,

said two-dimensional wedge centerbody being disposed in said rectangular section and serving to form with said top and bottom walls a pair of spaced rectangular openings serving as the nozzle exit,

said wedge centerbody being formed of a nose segment, a body segment and a tail segment and said nose segment being formed of two identical arcuate members hingedly connected along a hinge line to permit relative movement of the arcuate members toward each other along said hinge line, said body segment comprising two identical essentially flat members, each of said essentially flat members being hingedly connected at one end to opposite sides of an open end tail segment, said tail segment being of a wedge configuration and having an open end and a closed tip end, said other end of said essentially flat members each being provided with arcuate tips and telescopically received, individually, within one of said arcuate members forming said wedge nose segment, and

means for varying the thickness of said two-dimensional wedge centerbody between a contracted dimension and an expanded dimension to thereby vary the nozzle exit-to-throat area, while maintaining a symmetrical aerodynamic configuration for said wedge.

4,088,271

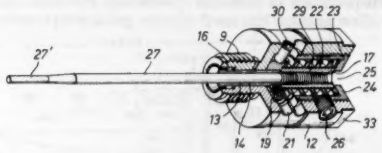
NEEDLE-VALVE FOR HOT RUNNER INJECTION MOULDING

Eduard Freddy Flygenring, Snebaervej 1, Kr.Sonnerup, 4060 Kr. Saby, Denmark

Filed Oct. 5, 1976, Ser. No. 729,849
Claims priority, application Denmark, Oct. 10, 1975, 4561/75
Int. Cl.[2] B05B *1/30*
U.S. Cl. 239—533.1 **9 Claims**

1. A needle-valve for an injection moulding machine's discharge orifices to the dies, said machine having a hot runner panel, and which is closed by spring means and opened by the

pressure of the molten material, comprising an axial adjustable needle mounted in a co-axial, longitudinally aligned first and second bushings for simultaneous movement, said bushings being slideably mounted in a housing, having at its forward end a screw thread stud for inserting in the backside of the machine's hot runner panel, means for inter-connecting said first bushing to said second bushing after inserting in the housing, said first bushing having at its forward end protruding abut-



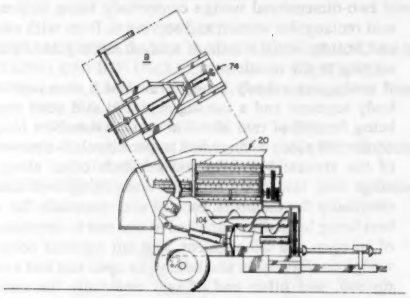
ment means, the backward end of said abutment means engaging the forward end of the housing in the retracted open position of the needle, said second bushing having at its forward end a protruding flange arranged for in the needle's extended closing position to rest with its front end against the housing and with its backside engaging the one end of spring means surrounding said second bushing, the other end of said spring means engaging a spring support longitudinally axially adjustably inserted in the housing from the backside of the same.

4,088,272

BALE LOADER AND SHREDDER

Homer N. Grillot, Naperville, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Apr. 15, 1975, Ser. No. 568,354
Int. Cl.² B02C *21/02*
U.S. Cl. 241—30 **8 Claims**



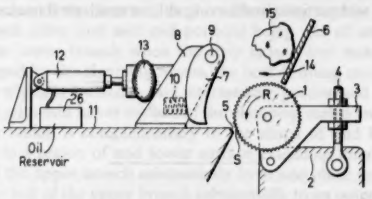
1. A machine for lifting a bale of hay from the ground, shredding the bale, and feeding the shredded hay therefrom, comprising:
- a mobile frame;
- an open-top hopper on said frame;
- a plurality of power-driven shredders in said hopper adapted to progressively shred hay from a bale introduced into said hopper;
- a bale-gripping and lifting apparatus on said frame for lifting a bale to a position above said hopper, said apparatus including means for selectively reducing gripping force on the bale to permit the bale to move by gravity into said hopper against said shredders for shredding;
- first conveyor means communicating with said hopper beneath said shredders for receiving shredded hay therefrom and conveying the hay out of said hopper; and
- second conveyor means disposed to receive the shredded hay from said first conveyor means and dispense the hay from the machine.

4,088,273

COMMINUTION MACHINE WITH A COMMINUTION ROTOR

Willy Jakobs, Cologne, Germany, assignor to Klöckner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Mar. 11, 1977, Ser. No. 776,782
Claims priority, application Germany, Apr. 3, 1976, 2614552
Int. Cl.² B02C *18/22*
U.S. Cl. 241—35 **12 Claims**



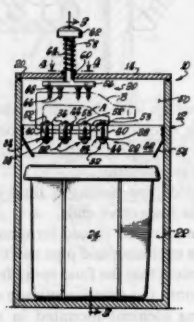
1. A comminution machine comprising:
- (a) a comminution rotor;
- (b) a crushing edge forming with the comminution rotor a crushing gap, a material charging region being positioned above the gap;
- (c) an adjustable rocker arm means for adjustment independently of the crushing gap, said rocker arm means being positioned in the material charging region at an adjustable spacing from the comminution rotor; and
- (d) said rocker arm means being arranged in a slidable support.

4,088,274

BOTTLE CRUSHER

Richard O. Smith, 7223 Comstock, Whittier, Calif. 90602

Filed Sep. 13, 1976, Ser. No. 722,864
Int. Cl.² B02C *19/12*
U.S. Cl. 241—99 **9 Claims**



1. A bottle crusher comprising:
- a pair of bottle crushing jaws for straddling a bottle to be broken including a relatively stationary jaw having pointed teeth arranged to form an upwardly opening craddle for a bottle and a movable jaw opposite the open side of said cradle movable toward and away from said stationary jaw and having pointed teeth engageable with a bottle in said cradle,
- said cradle having a longitudinal axis,
- said stationary jaw having four rows of teeth parallel to said cradle axis and including two inner rows and two outer rows of teeth all adapted to engage a bottle of given diameter,
- said two outer rows of teeth being adapted to engage a bottle

of larger diameter and said two inner rows of teeth being adapted to engage a bottle of smaller diameter than said given diameter, and

means for effecting relative movement of said jaws toward one another to forcibly engage said teeth with the bottle.

4,088,275

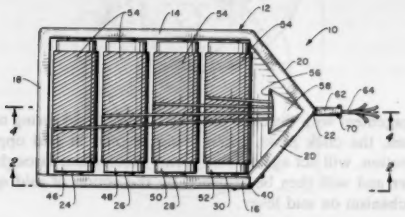
RIBBON DISPENSER

Dennis Ramos, 255 Barham St., Santa Rose, Calif. 95401

Filed Aug. 23, 1976, Ser. No. 716,515

Int. Cl.[2] B65H *19/04*

U.S. Cl. 242—55.3 **8 Claims**



1. A ribbon dispenser comprising:

a frame;

a plurality of shafts supported by said frame;

a spool rotatably supported on each said shaft, each said spool carrying a quantity of ribbon wound thereon;

a single funneling device attached to said frame at one end thereof, said funneling device being tubular and having an elongated opening therethrough, the longitudinal center axis of said opening when extended intersects the substantial mid-point in length of each of said shafts, each of said ribbons to extend through said opening whereby said ribbons may be used in unison in the constructing of a fly for fishing.

4,088,276

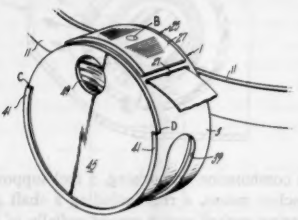
TAPE HOLDER AND DISPENSER

Gene Littleton, 105 SW. Cabana Pt. Cir., Stuart, Fla. 33494

Filed Dec. 13, 1976, Ser. No. 750,291

Int. Cl.[2] B65H *75/38;* B65D *85/672*

U.S. Cl. 242—55.53 **4 Claims**



1. A tape holder and dispenser comprising a cylindrical housing, said housing having a closed end and an open end, said closed end having a fixed spindle extending into said cylindrical housing for receiving a roll of tape which can rotate therearound, a first slot extending from adjacent the closed end to adjacent the open end for receiving the free end of a tape therethrough to extend from the interior to the exterior thereof, said cylindrical housing having a second slot extending around the lower periphery of the cylindrical housing through which a user's finger can extend to apply a rotating force to a roll of tape within the cylindrical housing for rolling the tape into said housing around said fixed spindle, an end plate fixed to said cylindrical housing covering the open end of the cylindrical housing, said spindle being fixed to said closed end against rotation and having a short cylindrical section at a center portion thereof, said spindle having surfaces on either side of said short cylindrical section tapering inwardly toward the center line of the spindle, the width of the cylindrical surface providing the desired amount of drag to a roll of tape rotatable thereon so that it will not turn too easily on the spindle.

4,088,277

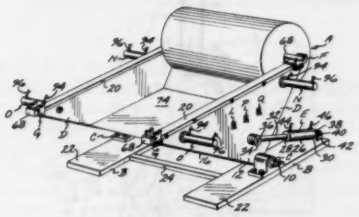
MULTIPLE LINER ROLL SUPPORT

Graham D. Councell, 8242 Brookgreen Rd., Downey, Calif. 90240

Filed Feb. 26, 1976, Ser. No. 661,482

Int. Cl.[2] B65H *19/06, 19/10*

U.S. Cl. 242—58.6 **4 Claims**



1. A power operated device for use in rotatably supporting first and second rolls of liner adjacent an end of a corrugated paperboard making machine for supplying liner to the latter in such a manner that as said first roll is depleted a liner is supplied to said machine from said second roll, and said device as it supplies liner to said machine from said second roll capable of being manipulated to have said first roll that has been depleted removed therefrom and replaced by a first replacement roll, said device when said second roll has been depleted capable of being manipulated to have said second roll removed therefrom and replaced by a second replacement roll, and said power operated device as it is manipulated capable of lifting said first and second rolls of liner and first and second replacement rolls of liner from a floor supporting said device to positions where they may rotate and said liner thereon fed to said machine, and said device in addition capable of rotatably supporting at least three split rolls when the occasion so requires, said device including:

a. a base;

b. a pair of transversely aligned journal blocks supported on said base;

c. a first shaft rotatably supported in said journal blocks;

d. a pair of inverted triangular shaped side plates that are laterally spaced a distance greater than the length of one of said rolls, each of said plates including an apex portion that has first and second angularly disposed side edges extending therefrom, a third edge that extends between the free ends of said first and second edges, and said apex portions of said side plates rigidly secured to said first shaft;

e. first means that are power operated for pivoting said side plates in unison relative to said base;

f. second means that are power-operated and supported from said side plates for removably engaging the ends of longitudinal openings in said first and second rolls and first and second replacement rolls of liner to rotatably support said rolls of liner in elevated positions where liner may be sequentially unwound therefrom, and delivered to said machine, and said first means capable of pivoting said pair of side plates relative to said base where said first and second rolls and first and second replacement rolls may be engaged and disengaged from said second means;

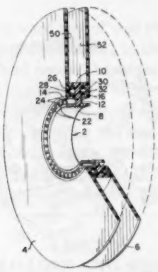
g. a pair of flanges that extend longitudinally on the sides of said plates most remote from said apexes;
h. at least three pairs of transversely aligned, longitudinally spaced carriages movably supported on said flanges; and
i. at least three shafts, with each of said shafts extending transversely between one of said pairs of carriages, and each of said shafts capable of rotatably supporting one of said split rolls.

4,088,278

REEL FOR MAGNETIC RECORDING TAPE

Henry Adair, Mission Viejo, Calif., assignor to Memorex Corporation, Santa Clara, Calif.

Filed May 16, 1977, Ser. No. 796,876
Int. Cl.² B65H *75/18*
U.S. Cl. 242—71.8 **13 Claims**



1. A reel for magnetic recording tape, comprising a hub including axially extending coaxial inner and outer rims joined by a radially extending web, and a coaxial intermediate ring on each side of said web extending axially outward of said web;
a pair of opposed flanges attached to and extending radially outward of said hub with a first said flange received on a first axial side of said hub and a second said flange received on the second, opposed axial side of said hub, each flange having a pair of coaxial rings extending axially inward of said flange with the radially outer said flange ring on each said flange being received against the corresponding radially inward portion of said outer rim, and the radially inner said flange ring on each said flange being received against the radially outward portion of the corresponding said intermediate ring, whereby the flanges and their flange rings may serve both to support the hub outer rim against radially inward deflection and also to carry a portion of any radially inward deforming forces on the hub outer rim to the hub intermediate rings for support.

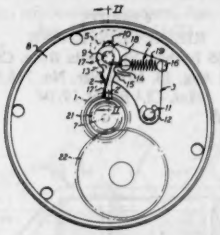
4,088,279

CLICK SIGNAL DEVICE FOR A FISHING REEL

Jarding Urban Karlsson, and Gerth Karl Anders Blomgren, both of Svangsta, Sweden, assignors to ABU Aktiebolag, Svangsta, Sweden

Filed Oct. 5, 1976, Ser. No. 729,650
Claims priority, application Sweden, Oct. 6, 1975, 7511154
Int. Cl.² A01K *89/00*
U.S. Cl. 242—84.1 R **6 Claims**

1. A click signal device for a fishing reel, comprising a rotary tooth wheel, a pivotable click pawl which is movable between an inactive position and an active signal-producing position out of and into engagement with the tooth wheel, a control member positioned accessible from the outside of the reel and connected to the click pawl for moving said pawl between said positions, and a spring mechanism connected with the click pawl for holding it engaged with the tooth wheel in the active position of the pawl to enable the pawl to be pivoted and for returning the pawl after pivoting thereof by the action of the tooth wheel, wherein the click pawl is pivotable in one direction from an intermediate position by rotation of the tooth wheel in one direction against the action of the spring mechanism which then returns the click pawl and is pivotable in the opposite direction from said intermediate position by rotation of the tooth wheel in the opposite direction, and a pivotally mounted lever connected to said spring mechanism and held in



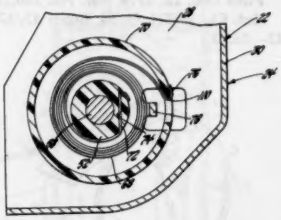
engagement with the click pawl by means of said spring mechanism, the click pawl, when being pivoted in said opposite direction, will act against said spring mechanism through said lever and will then be returned by the action of said spring mechanism on said lever.

4,088,280

INERTIA SEAT BACK LOCK

Alfonsas Arlauskas, Troy, and Richard D. Loose, Birmingham, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 686,693, May 17, 1976, Pat. No. 4,045,079.
This application Apr. 27, 1977, Ser. No. 791,294
Int. Cl.² A62B *35/02*; B65H *75/48*
U.S. Cl. 242—107 **2 Claims**

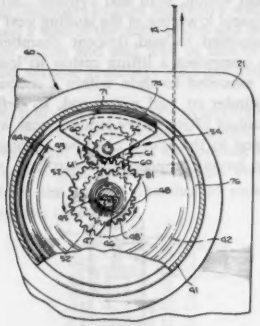


1. The combination comprising, a reel support having first spring anchor means, a reel including a shaft portion and a second spring anchor means spaced radially of the shaft portion, a coil spring including an inner end secured to the shaft portion and an outer hook end wound relative to the inner end to preload the spring and being releasably hooked to the second spring anchor means, a strap wound on the reel, means pivoting the reel to the support to locate the first spring anchor means radially inward and circumferentially behind the outer hook end of the spring in the unwinding direction, initial movement of the reel in an unwinding direction engaging the first spring anchor means with the outer hook end of the spring to transfer the outer hook end from the second spring anchor means to the first spring anchor means and connect the spring between the support and reel to bias the reel in a strap winding direction.

4,088,281
DUAL TENSION SINGLE SPRING RETRACTOR

Albert R. Close, Newhall, Calif., assignor to American Safety Equipment Corporation, Encino, Calif.

Filed Oct. 13, 1976, Ser. No. 731,665
Int. Cl.² A62B 35/00; B65H 75/48
U.S. Cl. 242—107 16 Claims



1. In a safety belt retractor having a safety belt wound upon reel and spring means for biasing said reel toward a belt retracted position, the improvement comprising the provision of:

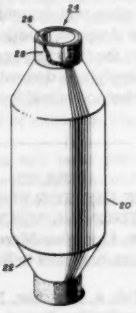
force reduction gear means interposed between said reel and spring means for transmitting the full bias of said spring to said reel when in a deactivated position and for reducing the bias effect of said spring means on said reel when in an activated position; and

means for selectively activating said force reduction gear means to said activated position to provide a reduced tension on said belt due to reducing the biasing effect of said spring means.

4,088,282
CRUSHABLE BOBBIN PACKAGE FOR CONJUGATE YARN

James R. Day, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 3, 1976, Ser. No. 747,448
Int. Cl.² B65H 75/20
U.S. Cl. 242—118.2 6 Claims



1. A yarn package, comprising in combination:

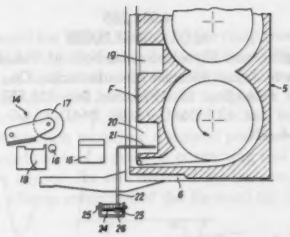
a. a right circularly cylindrical bobbin having a relatively soft outer surface layer, said surface layer having a Rockwell R hardness value softer than −25, being at least 4mm. thick, and being supported by an inner right circularly cylindrical wall of sufficient strength and thickness to withstand crushing by retraction forces of yarn wound on said bobbin, and

b. yarn wound on said bobbin to form said package, said yarn being a drawn two-component conjugate yarn wherein one component is a non-elastomeric polymer and the other component is an elastomeric polymer.

4,088,283
DEVICE FOR GUIDING A TAPE OUT OF A CASSETTE OPENING

Walter Etter, Valeyres sous Montagny, Switzerland, assignor to Bolex International SA, Ste-Croix, Switzerland

Filed Nov. 24, 1976, Ser. No. 744,778
Claims priority, application Switzerland, Nov. 28, 1975, 15521/75
Int. Cl.² G03B 1/04; G11B 15/32, 23/04
U.S. Cl. 242—197 9 Claims



1. Apparatus for extracting a tape-shaped record carrier from a cassette of the type having an opening exposing said tape and at least one tape winding device, comprising at least one tape collector means movably mounted for transition between a first position on the side of the tape facing towards said opening of said cassette to a second position at a distance from the cassette such that a loop of tape may be guided out of the opening of said cassette, and a pivot means affixed to and rotatably mounting one end of said tape collector means and disposed substantially parallel to the direction of movement of said tape prior to its extraction from said cassette, said pivot means being rotatably and rotatably mounting mounted and rotatably mounting such that the angle of rotation of the tape collector means between said first position and said second position is of such magnitude that the tape collector means will move out of the plane that is defined by the surface of the tape in its extracted position.

4,088,284
PHASING CONTROL FOR CONVERTIPLANE

Berwyn B. Caswell, Smithville, Tex., assignor to Textron, Inc., Providence, R.I.

Filed Jan. 21, 1976, Ser. No. 651,173
Int. Cl.² B64C 27/28
U.S. Cl. 244—7 R 8 Claims

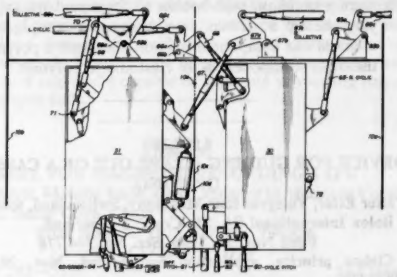
1. In a convertiplane having a pylon rotatable about a lateral axis from a position parallel along a longitudinal axis to a position normal to said longitudinal axis for selective operation in an airplane mode and a helicopter mode, respectively, the combination comprising:

(a) rotor blades on said pylon and a control linkage responsive to pilot input in said helicopter mode to vary collective and cyclic pitch of said rotor blades;

(b) drive linkage means for rotating said pylon about said lateral axis; and

(c) input means connected to said drive linkage means and

operable by said drive linkage means for reducing the authority of the pilot input on collective pitch as said



pylon is rotated toward said position parallel to said longitudinal axis.

4,088,285

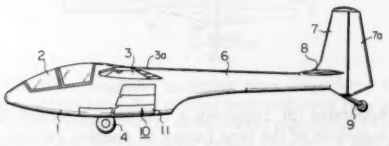
MOTOR-GLIDER

Itsushi Sogabe, and Kiyoshi Souda, both of Yokohama, Japan, assignors to Japan Aircraft Manufacturing Co., Inc., Japan

Filed Sep. 15, 1976, Ser. No. 723,557

Int. Cl.[2] B64C *31/02*; B64D *41/00*

U.S. Cl. 244—16 **12 Claims**



1. An improved motor-glider comprising:

a fuselage provided with wings and a retractable landing gear system;

a tail boom extending rearwardly and forming an integral part of said fuselage and provided with vertical and horizontal tails;

a propeller power system fully encased within a chamber formed in the rear bottom portion of said fuselage, said propeller power system including a tail cone facing an outlet formed in the rear end of said fuselage and rearwardly of and in communication with said chamber, and supported by the inner wall of said chamber via stators, a ducted propeller fan rotatably supported by said inner wall by struts on the front side of said chamber and an internal combustion engine supported by frameworks in said chamber and having a rearwardly extending drive means coupled to said ducted propeller fan for rotation of said propeller fan; and

air-intakes located on both sides of said fuselage forwardly of said power system and opening into said chamber and being covered by selectively openable shutters whose outer surfaces in the closed state are flush with the streamlined outer surface of said fuselage.

4,088,286

SHOCK ABSORBER

Jean Masclet, Paris, and Jacques Veaux, Chatillon-sur-Bagneux, both of France, assignors to Messier-Hispano, S.A., Montrouge, France

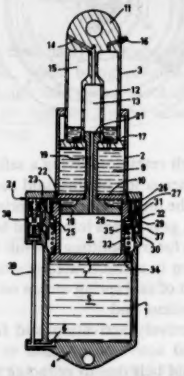
Filed Feb. 3, 1977, Ser. No. 765,284

Claims priority, application France, Feb. 4, 1976, 76 03126; Nov. 4, 1976, 76 33261

Int. Cl.[2] B64C *25/22, 25/60*

U.S. Cl. 244—102 SL **18 Claims**

1. A shock-absorber of the piston-and-cylinder kind for use in the landing gear of an aircraft and comprising a cylinder, a piston-rod and a shock-absorbing rod which encloses a chamber for compressed gas and is provided with a valve having a throttling orifice, said shock-absorbing rod is mounted to slide, in a fluid-tight manner in a first chamber filled with hydraulic fluid in either said cylinder or said piston-rod, to form a oleopneumatic shock-absorber; said piston-rod is mounted to slide, in a fluid-tight manner in said cylinder and is solidly connected to a piston-head which, with said cylinder, defines a descent chamber to control lowering of the landing gear when hydraulic fluid is admitted to said descent chamber, said shock-absorber also comprises a lifting piston to load said shock-absorber and mounted to slide within a second chamber in either said cylinder or said piston-rod, so defining a lifting chamber to control lifting of the landing gear when hydraulic fluid is admitted to the lifting chamber through a hydraulic locking valve having a pressure-controlled opening and a



locking device for locking said piston-rod in relation to said cylinder, in the "landing gear down" position, said locking device being releasable in two ways, firstly by the application of the lifting pressure to the landing gear, which simultaneously pressurizes said lifting chamber, by displacement of said lifting piston which loads said shock-absorber, and voids said descent chamber by displacement of said piston-rod in said cylinder, and secondly by the application of a simple pressure for releasing said locking device, thus permitting said piston-rod to be displaced in said cylinder under the action of the weight of the aircraft which thus moves the landing gear into a dropped position when said descent chamber is voided, the movement from the dropped position or the "landing gear retracted" postion to the "landing gear down" position being effectable solely by applying a descent pressure simultaneously in said descent chamber and at said locking valve, so as to open said locking valve.

4,088,287

DUAL-PURPOSE EJECTOR FOR AIRCRAFT LOAD JETTISONING MECHANISM

Jean H. Hasquenoph, Lagny-sur-Marne, and Pierre F. Coutin, Paris, both of France, assignors to R. Alkan & Cie., Valenton, France

Filed Feb. 4, 1977, Ser. No. 765,469

Claims priority, application France, Mar. 9, 1976, 76 06648; Aug. 9, 1976, 76 24257

Int. Cl.[2] B64D *1/02*

U.S. Cl. 244—137 R **8 Claims**

7. A telescopic retractable ejector for ejecting a load from an aircraft by gas thrust, comprising:

(i) a cylinder body

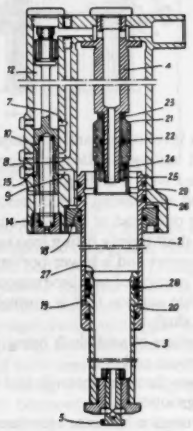
(ii) inlet means for feeding gas under pressure to said cylinder body,

(iii) an outer ejection piston slidably mounted within said cylinder body,

(iv) an inner ejection piston telescopically mounted within said outer ejection piston,

(v) means defining a gas storage chamber within said cylinder body connected through a non-return valve to said inlet means, for storing gas under maximum pressure, a connection being provided between said storage chamber and annular chambers located between a wall of the cylinder body and a wall of the outer piston and between a wall of the inner piston and said wall of said outer piston to provide said annular chambers with gas under maximum pressure,

(vi) a head portion of said outer piston having an upper face of greatest surface area to which is applied the gas pressure from the inlet means and an opposite lower face of reduced surface area submitted to gas under maximum pressure from the storage chamber to reduce the outer piston extension speed,



(vii) a head portion of said inner piston having an upper face of greatest area to which is applied the gas pressure from the inlet means and an opposite lower face of reduced surface area submitted to gas under maximum pressure from the storage chamber to reduce the inner piston extension speed,

(viii) means providing a connection, between the inlet means and an inner part of the inner piston, operative at the end of an extension stroke of the outer and inner pistons together, to apply gas under reduced pressure to an inner surface area of the inner piston for allowing said inner piston to perform a further extension stroke at a speed similar to its speed of extension together with the outer piston,

(ix) a spool valve on said inner piston for automatically venting to the atmosphere, at the end of the further extension stroke, residual ejection gases remaining within the inner piston, an automatic retraction of the outer piston and then of the inner piston being successively obtained by said connection, by the storage chamber, and by the annular chambers.

4,088,288

AIRCRAFT RAMP ASSEMBLY

Franklin K. Barnes, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.

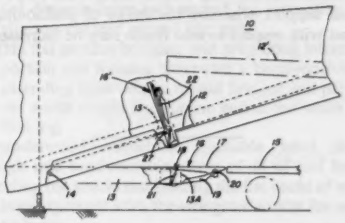
Filed Apr. 27, 1977, Ser. No. 791,223
Int. Cl.[2] B64C 1/22
U.S. Cl. 244—137 R **6 Claims**

1. An aircraft ramp assembly to facilitate loading and unloading of cargo, said ramp assembly including the combination of:

a ramp door,

a toe ramp including a forward toe leaf and an aft toe leaf, the forward toe leaf being coupled by hinge means along one edge of said ramp door and coupled by hinge means along the opposite edge to said aft toe leaf,

actuator means operatively connected to said ramp door and



said forward toe leaf to move said toe ramp from a stowed position into a position wherein at least said forward toe leaf defines an extension to said ramp door, and

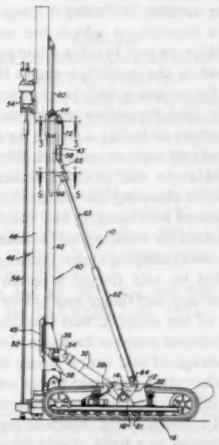
linkage means coupled between said ramp door and said aft toe leaf to selectively position the aft toe leaf into a predetermined position including a stowed position underlying the forward toe leaf, a position contacting said ramp door to form a support for said forward toe leaf, and a position forming a ramp extension of the forward toe leaf.

4,088,289

MAST SUPPORT ARRANGEMENT FOR PORTABLE DRILL RIG

John L. Wood, Salem, and Thomas C. Wenrich, Roanoke, both of Va., assignors to Gardner-Denver Company, Dallas, Tex.

Filed Feb. 25, 1977, Ser. No. 772,048
Int. Cl.[2] E21C 11/02
U.S. Cl. 248—2 **5 Claims**



1. A portable drill rig comprising:

a frame;

a mast support universally pivotally connected to said frame adjacent one end of said mast support;

a drill mast disposed on said mast support;

a pair of telescoping struts for positioning and supporting said mast with respect to said frame, said struts including means at one end of each of said struts for universally

pivotally interconnecting said struts and said frame and wherein said one ends are transversely spaced apart from each other;

a member connected to said mast support for limited longitudinal movement with respect to said mast support;

means on the end of each of said struts opposite said one end for universally pivotally connecting said struts to said member; and,

an actuator for moving said member with respect to said mast support whereby the range of positioning of said mast with respect to said frame may be increased.

4,088,290

ARTIST'S MAULSTICK

Louis J. Novello, 15 Marjorie Dr., Suffern, N.Y. 10901

Filed Feb. 2, 1977, Ser. No. 765,018
Int. Cl.[2] B43L *15/00*
U.S. Cl. 248—118.5 **1 Claim**

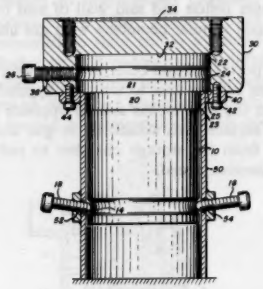
1. An artist's maulstick comprising, in combination, a pair of channel like members, an outer one and an inner one slidable longitudinally with respect to the other in which the outer channel member includes inturned arms for embracing the inner channel member, a depending bracket at each end of said members, means for locking said members at predetermined lengths thereof, means for preventing separation of said members during extension thereof, said depending bracket at one end of said outer member including a flange for engagement with a side of a support on which the maulstick is to be mounted, a shoulder on said bracket adapted to rest upon the support for elevating the maulstick above the surface of the support, means for securing said bracket to one end of said channel members, said depending bracket at the other end of said channel members including a flange for engagement with an opposite side of said support on which the maulstick is to be mounted, a shoulder on said second bracket adapted to rest upon the support for elevating the maulstick above the surface of the support, means for clamping said maulstick to the sides of the support, means for securing said bracket to an other end of said members, said clamping means including a thumb screw threadedly carried by said flange, wherein a shank of said screw extends through said flange and its free end is adapted to engage the side of the support, said clamping means further including a "U" shaped member having a clear opening in one of its legs for passage of said screw shank therethrough, said "U" shaped member straddling said flange and movable longitudinally under influence of the thumb screw, said one leg of said "U" shaped member being disposed on an outer side of said flange contiguous to a head of said thumb screw and the other leg of said "U" shaped member being disposed on the inner side of said flange for engagement with the side of the support by impression of the end of the screw, a resilient element being interposed between said one leg and a side of said flange for retracting the "U" shaped member as the thumb screw is unthreaded, and said flange on its inner surface having a recess into which said one leg is received upon retraction by the thumb screw of the "U" shaped member.

4,088,291

ROTARY LEVELING BASE PLATFORM

Robert W. Delaplaine, Woodside, and Daniel L. Mossolani, Los Altos, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 3, 1976, Ser. No. 738,218
Int. Cl.[2] F16M *11/08*
U.S. Cl. 248—186 **6 Claims**



1. A precision leveling apparatus comprising:

a base support having a hollow portion and an open end;

means provided with a table portion for supporting a piece to be leveled and having a shaft below said table portion and into the open end of said base support, an upper portion of said shaft tightly fitting into said hollow portion of said base support and a lower portion loosely fitting into said hollow portion of said base support, said table portion having a table surface that is normal to the longitudinal axis of said shaft;

said lower portion of said shaft being provided with a peripheral groove; and

adjusting screws threaded through said base support so as to touch said groove;

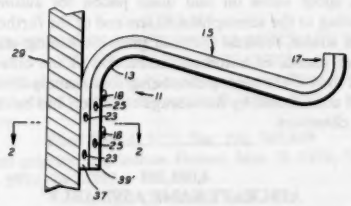
whereby the coaction between movement of said screws and said shaft is such that said lower portion of said shaft provides a lever, and said upper portion of said shaft provides a fulcrum at the point where said upper portion meets the hollow portion of said base support to thereby cause said table surface to be moved to a horizontal plane.

4,088,292

WALL HANGAR DEVICE

Mary Souhan Emminger, P.O. Box 36384, Dallas, Tex. 75235

Continuation of Ser. No. 524,480, Nov. 18, 1974, which is a continuation of Ser. No. 360,144, May 14, 1973, abandoned. This application Oct. 15, 1975, Ser. No. 622,453
Int. Cl.[2] F16M *13/00*
U.S. Cl. 248—205 R **15 Claims**



1. A wall hangar device of substantially unitary construction comprising a shank portion, the top of which extends outwardly into an arm portion, said arm portion being adapted to support an article desired to be suspended, said shank portion having a polygonal cross-section with an even number of sides,

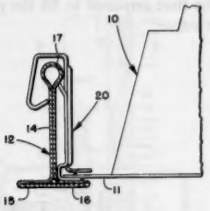
said number of sides being equal to or greater than six, thereby forming a plurality of three or more pairs of opposed sides, each of said pairs of opposed sides having at least one opening passing therebetween, said openings adapted to have a fastening device passed therethrough, whereby a desired angular relationship between said device and the surface on which it is mounted is chosen by selection of one of the pairs of opposing sides of said shank portion for passing through the opening therebetween a fastening device to be secured to said surface.

4,088,293

LAY-IN LIGHT FIXTURE RETAINER CLIP

Martin F. Delmore, Seven Hills, Ohio, assignor to Erico Products, Inc., Cleveland, Ohio

Filed Jun. 7, 1976, Ser. No. 693,694
Int. Cl.[2] B42F *13/00*; F21V *21/08*
U.S. Cl. 248—500 **12 Claims**



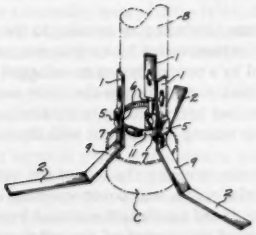
1. A hold-down and retaining clip for a lay-in light fixture in a suspended ceiling supported on a grid of inverted T-bars, said clip comprising a main body portion of L-shape configuration having an upper vertical leg and a lower horizontal leg adapted to lay substantially adjacent the stem and one bottom flange of the T-bar, respectively, said upper vertical leg of the clip being formed at its top in an enlarged bend and adapted to extend over the top of such stem with substantial clearance and terminating in a rebent edge adapted to engage the far side of such stem, said lower horizontal leg of the clip engaging and retaining the peripheral edge of a lay-in light fixture, and said upper vertical leg including an upwardly inclined bent portion extending toward the near side of such stem.

4,088,294

MULTIPURPOSE BRACKET

Lindy Aliment, 7030 S. 129th Pl., Seattle, Wash. 98178, and Manio L. Phillips, 613 S. 16th, Renton, Wash. 98055

Filed Nov. 26, 1976, Ser. No. 745,080
Int. Cl.[2] A47G *33/12*
U.S. Cl. 248—519 **1 Claim**



1. A support for maintaining an elongated article freestanding in upright position on a substantially horizontal supporting surface comprising at least three brackets spaced circumferentially around the base of the article, each of said brackets having:

a first leg disposed with its length extending substantially longitudinally of the elongated article;

a second leg disposed substantially perpendicular to said first leg;

said first and second legs being longer than they are wide and wider than they are thick;

a plane parallel to the width of each leg being perpendicular to the other leg;

said first leg having

a flat back engaging the longated article;

an intermediate portion at a location spaced a substantial distance from said second leg projecting generally toward said second leg; and

a thin flat portion bridging said projecting intermediate portion and forming therewith a band-receiving slot extending transversely of said first leg and parallel to the width of said flat portion and to the width of said first leg;

a circumferentially-adjustable bendable band threaded through said band-receiving slots of all of said brackets, encircling the article and holding the flat backs of said first legs in engagement with the elongated article for supporting the same;

said thin flat bridging portion of each first leg having a planar surface remote from said second leg at the region of said band-receiving slot which is substantially coplanar with the flat back of said first leg beyond said band-receiving slot in both directions, making the substantially flat back continuous lengthwise of said first leg so that said circumferentially-adjustable band will engage the article close to the edges of the thin flat bridging portions and the major portion of the band length next to the article will engage the article contiguously;

said second legs being disposed in substantially mutually coplanar relationship and having their lengths projecting substantially radially outward relative to the elongated article and their widths parallel to the supporting surface; and

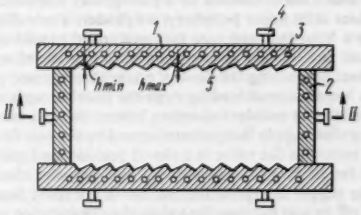
means for exerting lengthwise tension on said band for shortening said band circumferentially and thereby constricting it by sliding it through the band-receiving slots of a plurality of said brackets to draw the flat backs of said first legs into firm engagement with the elongated article.

4,088,295

MOULD FOR ELECTROSLAG CASTING OF FACETED METAL INGOTS

Boris Izrailevich Medovar, ulitsa Anri Barbjusa, 22/26, kv. 109; Viktor Alexeevich Efimov, ulitsa Vladimirskaya, 53/51, kv. 88; Viktor Lvovich Shevtsov, ulitsa Saxagonskogo, 35, kv. 6; Viktor Leonidovich Artamonov, ulitsa Shumskogo, 8[a], kv. 90; Alexei Georgievich Bogachenko, ulitsa Miljutenko, 15/2, kv. 141; Georgy Sergeevich Marinsky, ulitsa Tatarskaya, 1[b], kv. 19; Vitaly Ivanovich Sagan, ulitsa Kaunasskaya, 4/1, kv. 22; Jury Pavlovich Shtanko, ulitsa Ezhena Potie, 9, kv. 92, and Richard Yakubovich Yakobshe, ulitsa Kablukova, 11, kv. 36, all of Kiev, U.S.S.R.**

Filed Jan. 17, 1977, Ser. No. 760,026
Int. Cl.[2] B22D *7/06, 27/04*
U.S. Cl. 249—79 **6 Claims**



1. A mould for the electroslag casting of faceted metal in-

gots, comprising cooled walls, the internal surfaces of said walls forming a chamber for casting said ingots, and having longitudinal flutes made on said internal surfaces of at least two of said walls, said flutes having a depth which decreases in a horizontal direction from the middle of said walls to the corners of said mould.

4,088,296

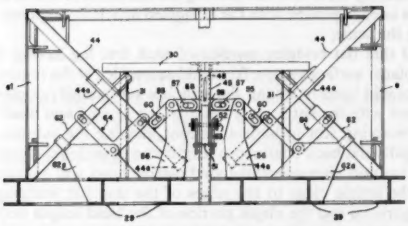
APPARATUS FOR MOLDING THE INTERIOR OF BUILDING MODULES

Eduardo Santana Armas, G.P.O. 3806, San Juan, P.R. 00936

Continuation-in-part of Ser. No. 594,035, Jul. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 544,418, Jan. 7, 1975, Pat. No. 4,019,293. This application Oct. 29, 1976, Ser. No. 736,845

Int. Cl.[2] B28B *7/30*

U.S. Cl. 249—180 **19 Claims**



1. Apparatus for molding interior surfaces of generally cubical building modules of concrete or the like having side walls joined along generally vertical edges and having a top wall spanning the side walls, said apparatus comprising: elongate, vertical, edge-defining members against which to mold a portion of the inside of said generally vertical edges; side wall mold sheets intervening between the edge-defining members; a mold sheet spanning the side wall sheets for molding the top wall of the modules; separate means mounting the edge-defining members and the side wall and top wall mold sheets and providing for translational movement between molding positions and retracted release positions; and operating means connected with said side wall and top wall mold sheets and with said edge-defining members for advancing and retracting said sheets toward and away from molding position and for advancing and retracting said members separately from said sheets toward and away from molding position.

4,088,297

TIMED METERING VALVE

Darrold E. Doyle, Plano, Ill., and Thomas G. Barnum, Fox Point, Wis., assignors to Bradley Corporation, Menomonee Falls, Wis.

Filed Nov. 3, 1976, Ser. No. 738,598

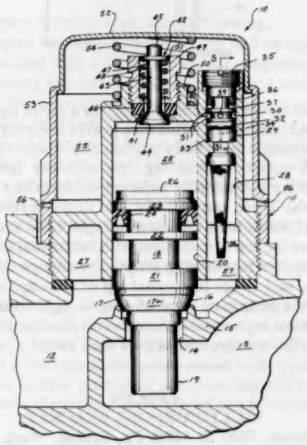
Int. Cl.[2] F16K *31/383*

U.S. Cl. 251—44 **2 Claims**

1. In a timed metering valve for controlling the flow of water which includes a valve body having an inlet and an outlet which are connected by a passageway surrounded by a valve seat at its upper periphery; a cylinder; a movable piston having a front face and rear face positioned in said cylinder, the front face of said piston being normally seated upon the valve seat preventing the flow of water through said passageway; a bypass circuit leading from the inlet through a timing mechanism to a pressure chamber behind the rear face of the piston so that supply line pressure sensed by the rear face of the piston maintains the valve in a closed position; and relief valve means for relieving the pressure in said pressure chamber so that the supply line pressure can move the front face of the piston off its seat to open the valve, the combination comprising:

(a) an enlongated nose on the front face of the piston, which nose projects below the valve seat even when the valve is open so that clearance between the piston nose and the valve seat results in a pressure drop across the seat at normal flow and as a result a reduced pressure acts on the front face of the piston;

(b) an improved timing mechanism which comprises a disc-like member of elastomeric material which is positioned in and which is completely contained about its periphery by a bore in the bypass circuit, an axial passage in said member through which water must pass to reach the pressure chamber and a timing adjustment screw having an axial passageway which is aligned with the axial opening in the disc member and a radial passage which leads from the axial passageway to the pressure chamber of the valve, which timing adjustment screw can be adjusted to exert an axially directed force upon the disc-like member to deform the material of the member into the axial passage thereby effectively reducing its effective diameter and controlling the time required to fill the pressure chamber and close the valve;



(c) relief valve means including an opening to the pressure chamber which is surrounded by a valve seat, said opening being closed by a poppet having an enlarged head the underside of which is seated upon the valve seat and an elongated stem, and spring means yieldably urging the poppet head into seating engagement with the valve seat, and

(d) a cover assembly covering the top of the valve body including the relief valve, said cover assembly including vauts to the outside and a push button spaced from the free end of the stem of the poppet of the relief valve by a compression spring so that when the push button is depressed the spring is compressed and the poppet is moved off its valve seat by the push button so that pressure is relieved in the pressure chamber by permitting the water to leave the pressure chamber and flow about the head of the poppet and stem into the cover assembly from which it exits through said vent.

4,088,298

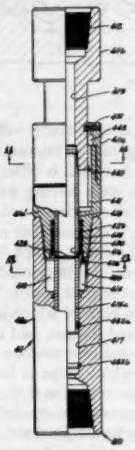
CHECK VALVE ASSEMBLY

Cicero C. Brown, deceased, late of Houston, Tex., by Joe Russell Brown, executor, and Ramey Lee Brown, executor, both of Houston, Tex., assignors to Brown Oil Tools, Inc., Houston, Tex.

Division of Ser. No. 495,874, Aug. 8, 1974, abandoned, which is a division of Ser. No. 322,217, Jan. 9, 1973, Pat. No. 3,850,194. This application Mar. 4, 1976, Ser. No. 663,902

Int. Cl.[2] F16K *15/18*

U.S. Cl. 251—149.8 6 Claims



1. A check valve assembly for permitting unrestricted flow in one direction and limited flow in the reverse direction comprising:

(a) a valve body having a longitudinal flowbore therethrough and including a first body portion telescopically engaging a second body portion for limited axial movement relative thereto;

(b) seat means carried by said valve body within said flowbore;

(c) closure means, comprising a flapper member, pivotally mounted within said valve body for pivotal movement from a normally open position in which flow through said flowbore is unrestricted, to a closed position, engaging said seat means, in which reverse flow through said valve body is prevented; and

(d) sleeve means carried by said valve body and including a first sleeve member, connected to said first body portion and responsive to said limited axial movement for movement between a first configuration, preventing movement of said closure means from said open position, and a second configuration, allowing movement of said closure means to said closed position, and a second sleeve member engageable with said first sleeve member, said second sleeve member being moveable, upon movement of said first body portion from an extended to a retracted position, from a first position, in which said second sleeve member prevents movement of said closure means from said open position, to a second position in which said second sleeve member does not prevent movement of said closure means.

4,088,299

SEAL ASSEMBLY

Vytautas K. Maciulaitis, Chicago, and Rasikant R. Dhanani, Darien, both of Ill., assignors to Crane Co., New York, N.Y.

Filed Dec. 16, 1976, Ser. No. 751,310

Int. Cl.[2] F16K *1/22, 1/228*

U.S. Cl. 251—173 19 Claims

1. A bi-directional valve seal assembly for preventing leakage of fluid past the valve closure means comprising:

A. a valve body having an inlet, an outlet and a passage therethrough for fluid flow;

B. a retaining ring having a passage therethrough communicating with said valve body, said valve body and said retaining ring each having a plurality of chamfers to form a recess therebetween open to the passage, the recess having a diverging, inverted "V" shaped section and a pair of shoulders, the shoulders being adjacent to the passage;

C. a seat ring disposed in the recess, and extending into the passage for engagement with the valve closure means, the width of said seat ring being slightly less than the corresponding width of the recess;

D. a back-up means located in the recess communicating with said seat ring, whereby fluid entering between said seat ring and the chamfers on the inlet side of the recess forces said back-up means into co-operative engagement with said seat ring to form a fluid-tight seal between said seat ring and the valve closure means, and forces said back-up means and said seat ring into co-operative fluid-tight engagement with a chamfer on the outlet side of the recess when the valve closure means is positioned perpendicular to the passage.

4,088,300

FLOW CONTROL VALVE FOR HOT PITCH OR OTHER VISCOUS MATERIAL

Seiichi Suzuki, and Tomizo Endo, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 7, 1976, Ser. No. 730,627

Claims priority, application Japan, Oct. 8, 1975, 50-136609[U]

Int. Cl.[2] F16K *1/32*

U.S. Cl. 251—319 4 Claims

1. A valve for controlling the flow of highly viscous material, comprising:

a housing provided with a fluid inlet, a fluid outlet, a fluid chamber in communication with said inlet, and a bore for providing a flow passage between the fluid chamber and the fluid outlet, said bore having a valve seat;

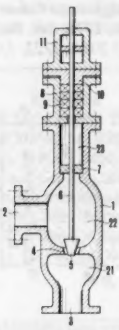
a cylindrical cavity extending contiguously above said fluid chamber and disposed concentrically relative to said bore;

a valve member having a rod extending through said fluid chamber and said cavity, and an element on one end of said rod cooperatively positioned relative to said bore and said valve seat to regulate the size of the flow passage through said bore;

a cylindrical guide member disposed within said cavity and coaxially with said valve member rod and having an aperture for slidably receiving said rod; and

a plurality of pointed axial ridges disposed around the circumference of the aperture of said guide member, said

ridges alternately positioned with a plurality of radial indentations disposed around the circumference of said



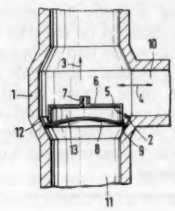
aperture, said ridges positioned to contact and to guide axial movement of said rod.

4,088,301

VALVE ARRANGEMENT FOR A VACUUM LINE

Gerhard Ehmig, Feldkirch-Tosters, Austria, assignor to VAT Aktiengesellschaft fur Vakuum-Apparate-Technik, Haag, Switzerland

Filed Nov. 11, 1976, Ser. No. 741,059
Claims priority, application Germany, Nov. 15, 1975, 2551429
Int. Cl.² F16K *1/00*
U.S. Cl. 251—334 **11 Claims**



1. In a valve arrangement for sealing a vacuum line communicating with a vacuum system, the arrangement comprising a metallic valve body including an edge portion elongated in a closed loop, seating means in said vacuum line conformingly engageable with said edge portion over the entire length of said loop, moving means for moving said valve body toward and away from a position of engagement of said edge portion with said seating means, and pressure means for pressing the engaged edge portion toward said seating means with a pressure sufficient to form a vacuum-tight seal therebetween, the improvement in said valve body and in said pressure means which comprises:

(a) said valve body including a plurality of wall portions jointly sealing a cavity in said valve body, a first one of said wall portions having a peripheral part including said edge portion and a central part enveloped by said peripheral part, said peripheral part being joined to at least one other wall portion along said closed loop, said first wall portion sloping inward of said cavity from each longitudinal section of said loop toward said central part; and

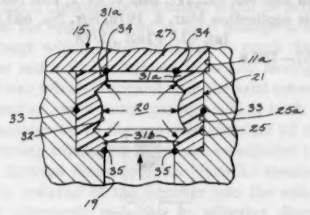
(b) supply means for supplying to said cavity a gas under a pressure sufficient to move said central part in a direction outward of said cavity and thereby to expand said peripheral part and the edge portion joined to said peripheral part for making said engagement with said seating means vacuum-tight.

4,088,302

SEAL MEMBER FOR FAUCET VALVE

Frank N. Williams, Aurora, Ill., assignor to Bradley Corporation, Menomonee Falls, Wis.

Filed Oct. 13, 1976, Ser. No. 732,023
Int. Cl.² F16K *27/00*
U.S. Cl. 251—361 **3 Claims**



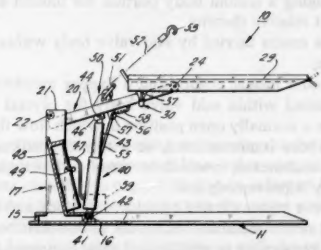
1. in a noncompression-type faucet valve of the type which includes a valve housing with an internal bore and an inlet port in the bottom of the bore which is offset from the axis of said bore; a rotatable valve stem having an inlet passage in the bottom of the stem which can be moved into and out of registry with said inlet port; a seal member receiving recess about the inlet port and a seal member which forms a tight seal with the bottom of said stem, the improved seal member which comprises a resilient cylindrical hollow body having an open top and an open bottom both of which are partially closed by inwardly directed tapered flanges, said member being further provided with an external intermediate outwardly extending circumferential ridge, which ridge is larger in diameter than the inner diameter of the recess so that once the member is in place the ridge is compressed to render the seal member immovable and to form a liquid-tight seal between the member and the side wall of the seal and to cause the flanges to flare outwardly to form liquid-tight seals with the bottom of the recess and the bottom of the stem.

4,088,303

LIFT FOR SMALL VEHICLES

Joseph Aquila, 144-41 231st St., Rosedale, N.Y. 11422

Filed Apr. 8, 1977, Ser. No. 785,860
Int. Cl.² B60P *1/16*
U.S. Cl. 254—88 **12 Claims**



1. Lift apparatus for supporting a vehicle in raised position, said apparatus including a base, platform means, a boom, first pivot means connecting said boom at its front end to said base and second pivot means connecting said boom at its rear end to said platform means at a position wherein the rear of said platform is biased downwardly by gravity, power means selectively operable to move said boom about said first pivot means to raise said rear end of said boom from a loading position to a working position, said rear of said platform means being generally at the level of said base when said boom is in said loading position and being substantially above the level of said base

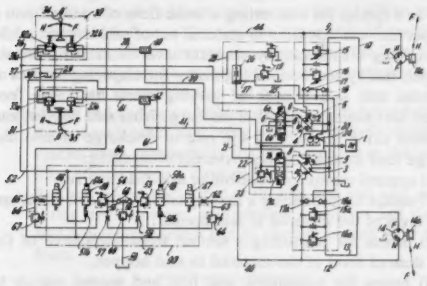
when said boom is in said working position, and stop means operative with said boom in said working position to limit downward movement of the rear of the platform means to a position convenient for working on a vehicle supported by said platform means.

4,088,304

WINCH SYSTEM CONTROL MECHANISM FOR THE SIMULTANEOUS CONTROL OF TWO WINCH MOTORS

Arno Gradert, Bad Segeberg, Germany, assignor to O & K Orenstein & Koppel Aktiengesellschaft, Germany

Filed Feb. 23, 1976, Ser. No. 660,154
Claims priority, application Germany, Feb. 25, 1975, 2507947
Int. Cl.² B66D *1/26*
U.S. Cl. 254—184 **7 Claims**



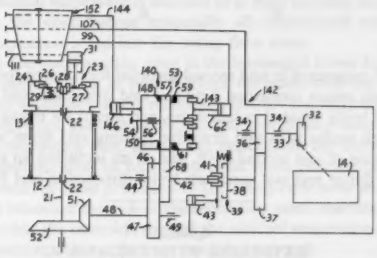
1. A winch control system for two winch motors, comprising first and second fluid-operated winch motors each having respective first and second rope drums, a rope engaged over each of said first and second rope drums maintained in tension therebetween and being paid out by one of said motors when the other of said motors is winding said rope up on the associated drum, a first adjustable cylinder fluid drive pump connected to said first winch motor, a second adjustable cylinder fluid drive pump connected to said second winch motor, a first servo valve connected to said first adjustable cylinder fluid drive pump and being continuously adjustable to vary the output of said first drive pump, a second servo valve connected to said second adjustable cylinder fluid drive pump and being continuously adjustable to vary the output of said second adjustable cylinder drive pump, conduit means interconnecting said first and second cylinder drive pumps and said first and second winch motors in a closed circuit including a first control connected to said first servo valve for varying the pressure acting on respective ends of said servo valve to cause said first adjustable cylinder to be varied selectively to deliver fluid pressure to drive said first winch motor and to relieve such fluid pressure and to permit reversal of said drive motor, a second control connected to said second servo valve for varying the pressure acting on respective ends of said second servo valve to cause said second servo valve to regulate said second adjustable cylinder fluid drive pump to be varied selectively to deliver fluid pressure to drive said second winch motor into relief pressure and to permit reversal of said second winch motor, and a control device in said conduit means connected between said first and second controls and said first and second servo valves for varying the driving pressure fluid acting on one of said first and second winch motors inversely in respect to the other of said winch motors in accordance with the pressure acting on the drum of the other of said first and second winches and the associated winch motor, said control device including a control line in the connection between said first and second controls and said first and second servo valves having a control space (**50***a*, **51***a*) for opening a stop valve (**48**, **49**) each of said first and second adjustable cylinder fluid drive pumps being connected to the associated winch motor through a respective first and second high pressure line, said stop valve being in a line leading from said high pressure line having aperture means (**57**, **58**), a branch line (**60**, **61**) connected upstream of said aperture means having a shuttle valve (**40**, **42**), and a control line connected to each of said winch motors and to said shuttle valve for the veering operation of one winch motor in response to the tension of the other motor.

4,088,305

BRAKE-ONE WAY WINCH

Ronald E. Wineburner, Pekin, and Norman R. Allen, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 17, 1976, Ser. No. 751,562
Int. Cl.² B66D *1/00*
U.S. Cl. 254—187.5 **7 Claims**



1. A winch and fluid control system which comprises (1) a rotatable drum for receiving and releasing a cable, (2) drive means for supporting said drum and for selectively transmitting rotary drive thereto, said drive means having a brake for stopping rotation of said drive means relative to stationary support means, (3) a source of pressurized fluid, and (4) control valve means having inlet means communicating with said source of pressurized fluid and having an outlet system and valving element means shiftable between at least three positions including a Brake-On position, a Reel-In position at which said brake is off and said drive means is reeling in said cable and a Brake-Off position, an improvement comprising:

one-way clutch means intermediate said brake and said stationary support means always allowing substantially unrestricted rotation of said drive means relative to said stationary support means in a reel-in direction when said brake is on or off and normally preventing rotation of said drive means relative to said stationary support means in a reel-out direction whereby reeling in of said cable can occur whether said brake is on or off; and

means intermediate said outlet system and said brake for selectively disengaging said brake to allow substantially unrestricted rotation of said drive means in said reel-out direction.

4,088,306

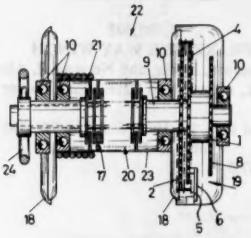
ROPE OR CABLE WINCH

Raimund Falkner, Roppen Nr. 64, Austria A-6426

Filed Apr. 23, 1976, Ser. No. 679,699
Claims priority, application Austria, Apr. 28, 1975, 3270/75
Int. Cl.² B66D *1/00*
U.S. Cl. 254—187.8 **10 Claims**

1. A winch having a rotatable cable drum comprising a rotatable first shaft having an eccentric hub portion, a first sprocket rotatably mounted on said eccentric hub for eccentric gyrating movement on said hub portion when said first shaft is rotated, holding means connected to said first sprocket at a fixed point for preventing rotation thereof whereby said holding means is allowed to oscillate when said first sprocket gyrates, a second sprocket rotatably mounted adjacent said first sprocket and having second annular gear means, said first sprocket having first annular gear means of a diameter differ-

ent than said second annular gear means and being engageably with at least a portion of said second annular gear means for effecting rotation of said second annular gear means by the eccentric gyrating movement of said first sprocket at a rotational rate less than the rotation of said first shaft, a second



shaft connected to said second sprocket for rotation therewith, clutch means connected between said drum and said second shaft being situated in said drum, and means for engaging said clutch means with said drum for rotating said drum with the rotation of said second shaft, said drum including an enlarged side flange and said sprockets being disposed in said flange.

4,088,307

EXTRUDER WITH DEGASSING

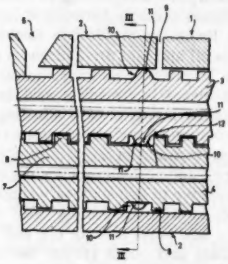
Warner Jan de Putter, Hardenberg, Netherlands, assignor to Wavin B. V., Zwolle, Netherlands

Filed Oct. 24, 1975, Ser. No. 625,704

Claims priority, application Netherlands, Oct. 24, 1974, 7413965

Int. Cl.² B29B *1/10*; B65G *33/08*; B29F *3/02, 3/03*

U.S. Cl. 366—75 **6 Claims**



1. In an extruder for synthetic material comprising an extruder housing having a material inlet and a material outlet, at least two worm conveyors disposed in said housing, said conveyors comprising a worm conveyor shaft having at least one helix thereon, an exhaust outlet for the gases generated in the extruder housing, said exhaust outlet being arranged downstream of the material inlet, and at least one distributing member located in said housing upstream of the exhaust outlet for distributing the synthetic material, the improvement comprising said distributing member including tooth-shaped heightened parts constructed as uniform burl-shaped projections and arranged on the periphery of each worm conveyor shaft for promoting uniform flow of the material while also providing a self-cleaning effect of said parts, the heightened parts on one worm conveyor shaft intermeshing at least partially with the heightened parts of the other worm conveyor shaft in a space between the worm conveyors such that the flow of material along the heightened parts is regularly divided and subjected to a rolling action by said heightened parts.

4,088,308

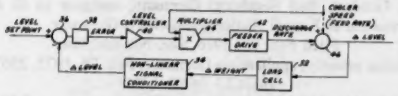
SYSTEM FOR CONTROLLING THE FLOW OF SINTER TO BLAST FURNACE

George C. Gingher, Jr., Dundalk, Md., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Nov. 15, 1976, Ser. No. 742,141

Int. Cl.² F27B *21/02*

U.S. Cl. 266—90 **4 Claims**



1. In a system for converting a batch flow of material into a hopper into a steady flow of material out of said hopper, while maintaining a substantially constant level of material in said hopper, said system comprising means for emptying batches of material into said hopper at varying rates, discharge feed means for causing material to discharge from said hopper, and a feeder drive for varying the rate of discharge of said discharge feed means, the improvement comprising:

(a) control means for controlling said feeder drive,

(b) means for producing a first signal indicative of the actual level of the material in said hopper,

(c) means for producing a second signal indicative of the desired level of the material in said hopper,

(d) means for combining said first and second signals to obtain an error signal,

(e) means interposed between said control means and means (d) for permitting said control means to change the rate of discharge of said discharge feed means only when said error signal exceeds a preset limit, and

(f) means interposed between said feeder drive and said control means for changing the rate of discharge of said discharge feed means in response to a change in the speed of said means for emptying material into said hopper.

4,088,309

COOLING DEVICE FOR SLABS WITH SLAB-TILTING DEVICES FOR TURNING THE ROLLED STOCK

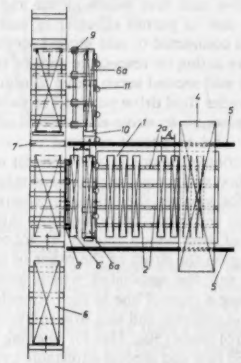
Horst Zurmahr, Ratingen, Germany, assignor to Sack GmbH, Düsseldorf-Rath, Germany

Filed Oct. 22, 1976, Ser. No. 735,076

Claims priority, application Germany, Oct. 28, 1975, 2548154

Int. Cl.² C21D *1/62*

U.S. Cl. 266—130 **8 Claims**



1. Cooling apparatus for slabs, comprising:

a cooling trough for receiving cooling water, and having front and rear ends;

a locating frame located in said cooling trough, and provided with substantially evenly spaced, adjacent compartments for receiving upright hot slabs to be cooled;

traveling crane means mounted above said cooling trough for movement therealong between said front and rear ends thereof, and including two side-by-side gripper devices having center lines spaced apart a distance corresponding to the distance between the center lines of said locating frame compartments, said traveling crane means and said gripper devices being adapted to grip an upright hot slab positioned at the front end of said cooling trough and deposit it in one of said compartments, and to grip an upright cooled slab and move it from one of said compartments to said front end;

first tilting device means arranged at the front end of said cooling trough, and adapted to receive and tilt an incoming hot slab from a flat position to an upright position;

second tilting device means also arranged at the front end of said cooling trough, and adapted to tilt an outgoing cooled slab from an upright to a flat position;

said first and said second tilting device means being independent of each other, and being placed with their centerlines spaced apart substantially the same distance as the centerlines of said gripper devices; and

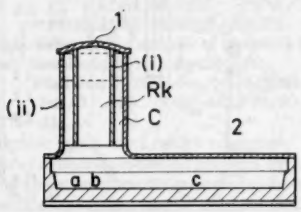
roller bed means associated with said first and said second tilting device means, and adapted to deliver hot slabs to said cooling apparatus and to remove cooled slabs therefrom.

4,088,310

APPARATUS FOR SUSPENSION SMELTING OF FINELY-GRAINED OXIDE AND OR SULFIDE ORES AND CONCENTRATES

Veikko H. Noponen; Simo A. Mäkipirtti, both of Harjavalta; Rolf E. Malmström, Pori; Tapio Kalevi Tuominen, Pori; Olavi August Aaltonen, Pori; Kauko Johannes Kaasila, Haukilahti; Toivo Adrian Toivanen; Seppo Untamo Harkki, both of Harjavalta, and Toivo Isak Niemelä, Otaniemi, all of Finland, assignors to Outokumpu Oy, Finland

Continuation of Ser. No. 519,638, Oct. 31, 1974, abandoned, which is a continuation of Ser. No. 289,634, Sep. 18, 1972, abandoned. This application Jul. 8, 1976, Ser. No. 703,666
Claims priority, application Finland, Sep. 19, 1971, 2610/71
Int. Cl.² C22B *1/02*
U.S. Cl. 266—162 **2 Claims**



1. In an improved suspension smelting furnace for the suspension smelting of finely-grained oxide or sulfide ores and concentrates, and of the type having

(1) as a base a horizontal lower furnace comprising a main smelt reaction zone and a settling zone;

(2) at least one vertical suspension reaction zone communicating at its lower end with the horizontal lower furnace;

(3) at least one vertical rising-flow zone communicating at its lower end with the horizontal lower furnace;

(4) means attached to the upper end of the suspension reaction zone for the production of a suspension of finely-grained oxide and/or sulfide ores or concentrates with air, oxygen or both, and for feeding this suspension downwards in the reaction zone;

wherein said main smelt reaction zone in the lower furnace is under the suspension reaction zone in which main smelt reaction zone the bulk of the suspension is adapted to be dissolved vertically in the smelt accumulated in the lower furnace main smelt reaction zone;

(5) and means attached to the upper end of the rising-flow zone for withdrawing the residual suspension, the improvement comprising:

said horizontal lower furnace which includes 3 zones (a), (b) and (c) wherein

(a) is the main smelt reaction zone disposed under said suspension reaction zone;

(b) is a secondary smelt reaction zone in the lower furnace which is disposed under said rising-flow zone, wherein the residual suspension is allowed to at least partially dissolve in the smelt before essentially all undissolved residual suspension is fed into the rising-flow zone;

(c) is the smelt settling zone in the horizontal lower furnace communicating at least through the smelt with the main and secondary smelt reaction zones for the separation of slag from matte and metal, and comprising means for withdrawing slag, metal, and matte from the horizontal lower furnace, in which the main smelt reaction zone is placed in close proximity to the rising-flow zone in order to minimize the area of the secondary smelt reaction zone so that the retention time of the residual suspension in the horizontal lower furnace is minimized; and

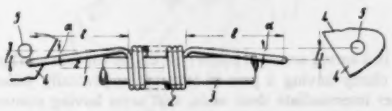
(d) two vertical shafts, each of which is connected at its lower end with the horizontal lower furnace, (i) one of said two vertical shafts encompassing the reaction zone of (2) and (ii) the other of said two vertical shafts encompassing the rising-flow zone of (3), wherein (ii) is disposed concentrically inside (i) in an arrangement wherein a cross-section of that arrangement is ring-shaped.

4,088,311

TENSION SPRING ARRANGEMENT

Kurt Rupprecht, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Apr. 20, 1977, Ser. No. 789,254
Claims priority, application Germany, May 3, 1976, 2619123
Int. Cl.² F16F *1/12*
U.S. Cl. 267—74 **2 Claims**

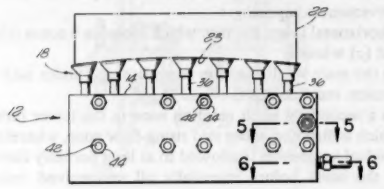


1. In a spring arrangement comprising a coil-type tension spring having a spring body with a plurality of turns and two off-center hook portions joining, respectively, the two turns at the opposite ends of the spring body, at least said two end turns of said spring body coacting with abutment means which act at right angles to the longitudinal axis of the spring thereby to maintain the spring in position, the improvement that when the spring is in its non-installed state, the inclination of said hook portions with respect to the longitudinal axis of the spring is different from the inclination of said hook portions when said spring is in its installed state, the difference in inclination α being such that when the spring is in its installed state, there is applied to said spring body a bending moment which, in magnitude and direction, is at least approximately equal to the bending moment which would be applied to said spring body were said hook portions arranged not off-center but in alignment with said longitudinal axis of said spring.

4,088,312
VARIABLE CONTOUR SECURING SYSTEM

Robert A. Frosch, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Paul P. Zebus, Lakewood, Calif.; Poley N. Packer, Long Beach, Calif., and Cyrus C. Haynie, Newport Beach, Calif.

Filed Sep. 27, 1977, Ser. No. 837,260
Int. Cl.² B25B 11/00
U.S. Cl. 269—21 7 Claims



1. A variable contour securing system including:

means for retaining a member at a surface having a variable contour comprising a spaced array of adjustable spindles mounted on a housing base member having supporting cups at one end thereof;

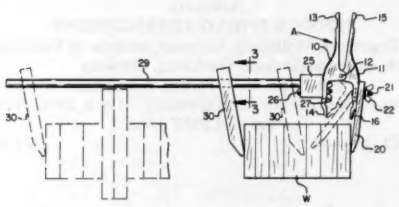
means for providing a vacuum source to said cups for seating said member adjacent to said cups; and

reference spindles being provided which are fixedly secured to said housing base.

4,088,313
SPRING ACTUATED WOODWORKING CLAMP

Hilding A. Pearson, 8150 SW. Peters Rd., Portland, Oreg. 97223

Filed Apr. 19, 1977, Ser. No. 788,739
Int. Cl.² B25B 5/16
U.S. Cl. 269—88 1 Claim



1. In a spring actuated pliers type clamp for thin workpieces, said clamp having a pair of lever arms pivotally joined together intermediate their ends, said arms having convergent nose ends for clamping thin workpieces; the improvement comprising a first clamp jaw extending in prolongation of one of said nose ends and detachably secured to the back side thereof by a bolt, a block detachably secured to the back side of the other nose end by a bolt, a bore in said block perpendicular to said other nose end, a rod secured at one end in said bore and extending away from said other nose end, and a clamp jaw slidably mounted on said rod for clamping thick workpieces between said two jaws.

4,088,314
SYNCHRONOUS STACKING DEVICE

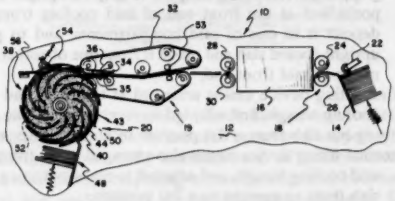
Ronald Alfred Phillips, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 22, 1977, Ser. No. 789,904
Int. Cl.² B65H 43/00
U.S. Cl. 271—176 6 Claims

1. A stacking apparatus for receiving and stacking documents fed to it in a random spaced apart relationship by delivery means, said apparatus comprising:

carrier means movable at a constant predetermined speed and forming a plurality of equally spaced document-accepting segments interspersed with document non-accepting segments;

delivery means for moving documents at a constant speed correlated with the speed of said carrier, said delivery means being movable between a first position and a second position for delivering documents to said carrier means at respective first and second discharge areas;



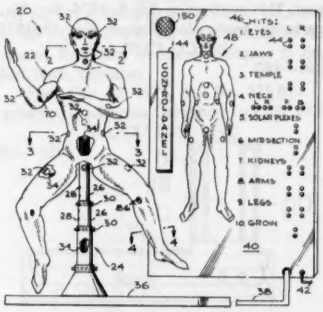
comparator means for sensing the orientation of the carrier means relative to a document in the delivery means and for moving said delivery means to said second position whenever the orientation of said delivery means would result in said document encountering a document non-accepting segment of the carrier means and would not allow said document to enter a document-accepting segment when said delivery means is in said first position; and

means for removing an inserted document from an accepting segment of said carrier and depositing the removed document in a stacked relationship with preceding documents.

4,088,315
DEVICE FOR SELF-DEFENSE TRAINING

Robert Archer Schemmel, 18012 Hiawatha St., Northridge, Calif. 91324

Filed Jul. 21, 1976, Ser. No. 707,361
Int. Cl.² A63B 69/00
U.S. Cl. 272—76 29 Claims



1. An improved device for use in self defense training, said device comprising, in combination:

a. a training dummy having a human appearance and configuration;

b. means movably supporting said dummy, said means including a base having weight detecting means to detect the presence of a person standing thereon and to activate means to move said dummy in response to weight detection;

c. pressure responsive means disposed at various target locations within said dummy adjacent the surface thereof; and,

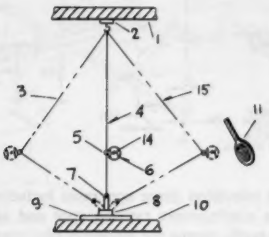
d. signaling means interconnected to said pressure response means for signaling when said pressure responsive means are hit during practice with said dummy.

4,088,316

DEPRESSURIZED TETHERED TENNIS BALL TRAINING DEVICE

Marius Szafianski, 230 E. 79th St., Apt. 7C, New York, N.Y. 10021

Filed May 13, 1976, Ser. No. 686,051
Int. Cl.² A63B *69/38*
U.S. Cl. 273—29 A **8 Claims**



1. A tennis training device supported between upper and lower supports comprising: a depressurized tennis ball with at least one opening communicating with the interior and exterior of said tennis ball, air escaping from the interior of said ball to the exterior thereof when said ball is struck; a flexible elastic string member connected to said ball and having one of its ends connected to, said upper support and its other end connected to said lower support, said ball being connected to said flexible member at a point between said upper and lower supports, said ball and flexible elastic member oscillating when said ball is struck; said lower support including means for counting strokes only when said ball is struck to move in a pre-determined direction for registering only correctly applied strokes, air passing through said opening from the interior of said ball when struck is functional in limiting controlably the oscillation of said ball.

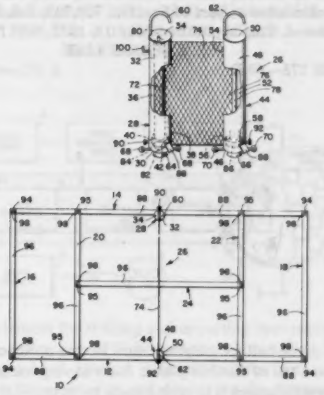
4,088,317

PORTABLE TENNIS COURT

Joyce Gierla, Edison, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 7, 1976, Ser. No. 647,080
Int. Cl.² A63C *19/06*; A63B *61/00*
U.S. Cl. 273—31 **9 Claims**

1. A portable tennis court, which comprises:
(a) a pair of cylindrically shaped housings, each said housing having a base, an upwardly extending cylindrically shaped sidewall, a top, and an interior chamber therein, each said sidewall having an elongated longitudinal aperture therethrough and a pair of slot openings therethrough;
(b) a pair of wheels mounted to each said base of each said housing, said wheels adapted to engage the ground;
(c) a reel assembly contained in one said housing;
(d) a mounting means contained in said chamber of said other housing;
(e) a net contained on said reel assembly, said net extending outwardly through said longitudinal aperture of said first housing, inwardly through said longitudinal aperture of said second housing, and affixed to said mounting means in said chamber of said other housing;
(f) means for anchoring each said housing to said ground;
(g) a pair of tape reels mounted for rotation in each said housing; and



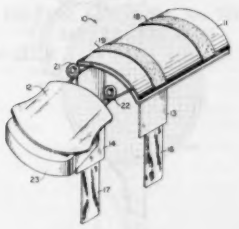
(h) an elongated tape associated with each said tape reel, said tapes extending through said slot openings of said housings.

4,088,318

WRIST SUPPORT FOR ATHLETES

Reinhart T. Massman, P.O. Box 92, Paullina, Iowa 51046

Filed Jan. 12, 1977, Ser. No. 758,625
Int. Cl.² A63B *69/36*
U.S. Cl. 273—54 B **10 Claims**



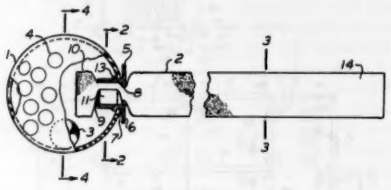
1. A wrist support for athletes comprising:
(a) a first substantially rigid member adapted to engage substantially all of the knuckle area of the back of a user's hand;
(b) a second substantially rigid member adapted to be adjustably affixed to the forearm of a user and
(c) resilient biasing means associated with said first and second members holding said first member in a rest position of between about 30° and about 45° to said second member, such that when said first substantially rigid member engages the back of a user's hand and said second substantially rigid member is affixed to the forearm of a user, said resilient biasing means maintains the back of the user's hand at an angle inward to the user's body of about 30° to 45° with respect to the forearm of the user, in the rest position.

4,088,319

GAME BALL WITH FLEXIBLE PLASTIC FOAM TAIL

William A. Clarke, 3420 Pine Tree Ter., Erie, Pa. 16506

Continuation-in-part of Ser. No. 708,743, Jul. 26, 1976, abandoned. This application May 11, 1977, Ser. No. 795,928
Int. Cl.[2] A63B 43/02
U.S. Cl. 273—58 R 4 Claims



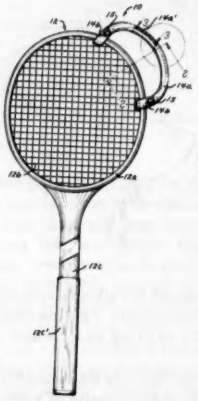
1. A game ball for playing catch having attached thereto an elongated tail of flexible plastic foam having memory or resilience which causes it to spring back to its original shape when deflected and being of light weight relative to the ball so the tail follows the ball in flight, said tail being substantially 10 to 25 inches in length so the ball may be caught while in flight by grasping its tail as the ball moves past the catcher and the ball may be thrown by grasping the end of the tail remote from the ball and whirling the ball about and releasing the tail when the ball is travelling in the desired direction and at the desired speed, and the cross section and bulk of said tail being of such size that said tail has substantially no tendency to tangle with or wrap around objects such as tree limbs with which it may come in contact during flight.

4,088,320

TENNIS RACKET ATTACHMENT

Joe F. Brock, 108 Kenwood Dr., Newburgh, Ind. 47630

Filed Oct. 29, 1976, Ser. No. 736,864
Int. Cl.[2] A63B 49/00
U.S. Cl. 273—73 R 1 Claim



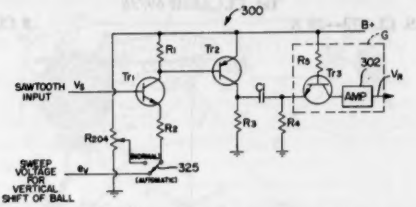
1. The combination of a tennis racket having a frame surrounding a string area and an attachment selectively secured to said frame, where the attachment comprises a first and a second resilient retaining member extending along the upper portion of said frame in a side-by-side relationship, said retaining members angling outwardly with respect to each other and to said frame and each having a base portion disposed on opposite sides of said frame, fastening means releasably assembling said base portions together on said frame, and a series of contacts on the inner surfaces of said retaining members selectively gripping a tennis ball.

4,088,321

CIRCUITRY FOR CONTROLLING LOCATION OF A RACKET IN A TELEVISION GAME APPARATUS

Hiroshi Sakurai, Funabashi, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan

Filed Dec. 3, 1976, Ser. No. 747,341
Int. Cl.[2] A63F 7/06, 9/00
U.S. Cl. 273—85 G 6 Claims



1. In a television game apparatus including means for displaying a continuously moving spot and at least two other movable spots, means for automatically controlling the vertical and horizontal location of said continuously moving spot on said display means, wherein said continuously moving spot controlling means generates a vertical location voltage for controlling the vertical location of said continuously moving spot on said display means, means for generating a vertical sweep signal having a sawtooth configuration wherein each signal of said sawtooth signal corresponds to one vertical scan period for said scan displaying means and means for individually controlling the vertical and horizontal location of said at least two other movable spots on said display means, the improvement comprising:

means within said movable spot controlling means being simultaneously responsive to said vertical sweep signal and said continuously moving spot vertical location voltage for generating a vertical location pulse timed with respect to said vertical scan period to correspond to said vertical location of said continuously moving spot said vertical location pulse generating means including a first transistor having an emitter connected to receive said vertical location voltage and having a base connected to receive said vertical sweep signal, wherein said vertical location voltage controls the threshold and biases said first transistor in an on or off state, said first transistor switches from its biased state to an opposite state when said vertical sweep signal level exceeds said threshold, thereby switching the voltage level at the collector of said first transistor from a first to a second level.

4,088,322

TARGET CARRIER PROTECTION SYSTEM

Joseph Nikoden, Jr., Inverness, Ill., assignor to Detroit Bullet Trap Corporation, Schaumburg, Ill.

Filed Jun. 22, 1976, Ser. No. 698,351
Int. Cl.[2] F41J 1/20, 7/00
U.S. Cl. 273—105.6 7 Claims

1. In a target shooting range having a designated shooter position and a target position, a target carrier system comprising:

a carrier medium extending between the designated shooter position and the target position,

a movable target carrier mounted for movement along a path defined by the carrier medium between the shooter position and the target position,

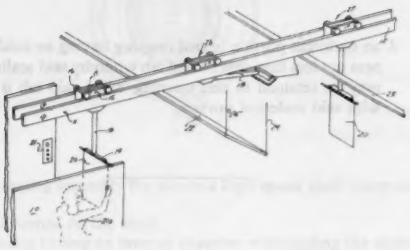
said movable target carrier having an upper carriage portion, a lower target holder portion and a suspending sys-

tem means depending from said upper carriage portion for holding the target holder portion and a target in view of a shooter,

a normally stationary protective shield mounted in the shooting range between the shooter position and the target position,

said protective shield having an obliquely oriented continuous smooth surface extending perpendicular to the direction of and below said carrier medium,

said continuous smooth surface extending to both sides of a vertical line intersecting the mid-point of said carrier medium by a distance which is greater than the amount



which any portion of said movable target carrier extends to either side of a vertical line intersecting the mid-point of said upper carriage portion,

whereby said upper carriage portion and at least a portion of said suspending means are shielded from the view of a shooter at the shooter position,

said target carrier lower target holder portion being movable with respect to said upper carriage portion, and wherein means are provided to move said lower target holder portion into a retracted position above and clear of said normally stationary protective shield while said target carrier is moved between the target and shooter positions.

4,088,323

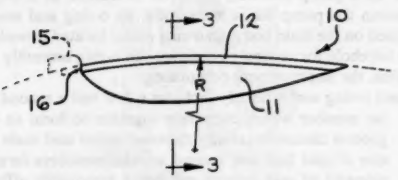
ARROW VANE AND METHOD FOR THE PREPARATION THEREOF

Richard R. Munger, Charlotte, Mich., assignor to MW Industries, Inc., Potterville, Mich.

Division of Ser. No. 714,091, Aug. 13, 1976. This application Jun. 17, 1977, Ser. No. 807,570

Int. Cl.² F41B *5/02*

U.S. Cl. 273—106.5 C **3 Claims**



1. In a vane for arrow shafts molded of a thermoplastic elastomeric polyurethane including a fletch projecting from the point of a V shaped base with an obtuse inside V angle which attaches to the arrow shaft; the improvement which comprises:

(a) a base which as molded has a slight reverse curve towards the point of the V; and

(b) a fletch which has a cross-section which tapers from the point of the V to the edge of the fletch and has a matted dull surface wherein the vane when attached to an arrow shaft is free from surface wrinkles on the fletch.

4,088,324

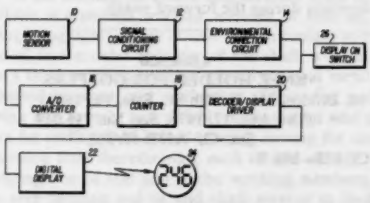
ATHLETIC IMPLEMENT WITH VISUAL RANGE DISPLAY

Everett Walter Farmer, 3 Eastbrook Dr., Nashua, N.H. 03060

Filed Dec. 6, 1976, Ser. No. 747,413

Int. Cl.² A63B *69/36*

U.S. Cl. 273—186 A **9 Claims**



1. An implement for striking and imparting movement to an object along a direction of flight comprising, an athletic implement having a head portion, a handle portion and self-contained means for measuring and displaying the distance traveled by the struck object, said self-contained means including motion sensing means responsive to a component of motion in said direction of flight and mounted in said head portion of the implement for producing an output signal the amplitude of which is proportional to the distance traveled by said struck object along said direction of flight, circuit means mounted in said handle portion of the implement and connected to said motion sensing means for receiving said output signal and for producing digital signals corresponding to the distance traveled by said struck object and digital display means mounted to said handle portion of the implement and connected to said circuit means for receiving said digital signals and for visually displaying an indication of the length of the distance traveled by said struck object in numerical increments of linear measure.

4,088,325

GOLF SWING TRAINING DEVICE

Otis Benjamin Sutton, 905 E. Maple St., North Canton, Ohio 44720

Filed Dec. 6, 1976, Ser. No. 747,691

Int. Cl.² A63B *69/36*

U.S. Cl. 273—187 R **4 Claims**

1. A golf instructional device including:

(a) a generally flat rectangular-shaped base having a planar top surface;

(b) a pair of convexly-curved members attached to the top surface of the base and extending transversely across and upwardly from said base in a spaced parallel relationship;

(c) a generally flat rectangular-shaped rigid rocking board having planar top and bottom surfaces;

(d) a convexly-curved member fixed to the bottom surface of the rocking board and extending transversely across and downwardly from said bottom surface, said curved member being located off-center of the transverse centerline of

said rocking board, and similar in size and configuration to the pair of convexly-curved members of the base; and

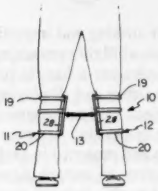
(e) the curved member of the rocking board being located in the space between the curved members of the base and engageable with said base curved members to pivotally mount said rocking board on the base, whereby a golfer standing upon the rocking board pivots said platform in one direction when entering a backswing and in another direction during the forward swing.

4,088,326

KNEE HOLDER FOR GOLFERS

John M. Bifulco, 911 E. 34th St., Erie, Pa. 16503

Filed Aug. 17, 1976, Ser. No. 715,049
Int. Cl.[2] A63B *69/36*
U.S. Cl. 273—188 R **1 Claim**



1. A golf practice device comprising,

two knee-engaging members,

each said knee-engaging members comprising two sheets of flexible material,

a generally rectangular, relatively flat rigid plate sandwiched between each two said sheets and having a substantial length and width to make said knee engaging members generally rigid,

means securing said sheets together around the outside edges of said generally rectangular member,

an eyelet fixed to each said plate and extending through one said sheet member,

three spaced leg encircling straps attached to a sheet member adjacent each said plate,

a buckle on an end of each said strap,

one said strap on each said sheet being attached to said sheet adjacent each end thereof and the other said strap being attached to said sheet between the said eyelet thereon and to another said strap,

one said strap being adapted to encircle the said leg of the said golfer below his said knee joint and the two other straps being adapted to encircle the leg above the said knee joint whereby said eyelet is supported at said knee joint and a flexible member attached to each said eyelet for limiting the movement of said relatively rigid plate members and the knees of said golfer away from each other during the swing of his golf club.

4,088,327

SEALING RING WITH TABS FOR HOLDING FOR ASSEMBLY

Walter W. Bachle, Harwinton, Conn., assignor to General Signal Corporation, Rochester, N.Y.

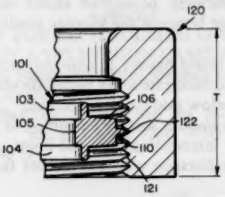
Filed Jun. 22, 1977, Ser. No. 809,139
Int. Cl.[2] F16J *15/06*; F16B *39/24*
U.S. Cl. 277—11 **13 Claims**

1. A subassembly comprising in combination:

a. a discontinuous sealing ring having a predetermined axial thickness;

b. said sealing ring including one or more radially projecting tab members having an axial thickness which is not more than about 25 percent the predetermined axial thickness of said sealing ring;

c. a body member having an opening for accommodating said sealing ring in mating relationship; and



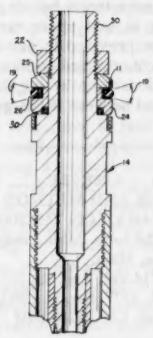
d. an undercut portion in said opening having an axial thickness not less than that of said tab whereby said sealing ring may be retained in said opening when said tab is mated with said undercut portion.

4,088,328

O-RING SEAL ASSEMBLY FOR BOREHOLE PUMP ASSEMBLY

George K. Roeder, P.O. Box 4335, Odessa, Tex. 79760

Filed Jun. 20, 1977, Ser. No. 808,031
Int. Cl.[2] B65D *53/02*; F04B *17/00*
U.S. Cl. 277—12 **11 Claims**



1. In a pump assembly received downhole in a borehole wherein the pump has a main body, an o-ring seal assembly formed on the main body, an o-ring collar located downhole in the borehole for sealingly receiving the o-ring assembly therewithin, the improvement comprising:

said o-ring seal assembly includes a first and a second annular member which cooperate together to form an o-ring groove circumferentially disposed about said main body, one of said first and second annular members forming a sidewall of said groove and being removably affixed to said main body, the other of said first and second members forming the other sidewall and the bottom of said groove;

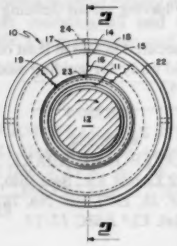
said o-ring assembly further includes a relatively thin annular retainer member having opposed relatively wide circumferentially extending faces; an o-ring having a continuous circumferentially extending face thereof bonded to one face of said retainer;

said o-ring and retainer being removably captured in close tolerance relationship within said o-ring groove in such a manner that the outermost side of the o-ring is free to sealingly engage the o-ring collar.

4,088,329
CONTROLLED APERTURE SEAL WITH DRAG PAD

Arnold E. Junker, Bridgeport, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Sep. 17, 1976, Ser. No. 724,139
Int. Cl.[2] F16J *15/30*
U.S. Cl. 277—26 6 Claims

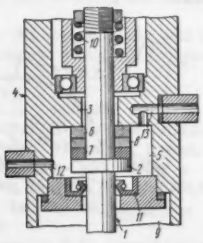


1. A sealing assembly for use on a high-speed shaft comprising:
a seal runner on the shaft;
a housing having an interior chamber surrounding the shaft;
a sealing ring mounted for free rotation on the seal runner within the housing chamber, said sealing ring having an inner diameter greater than the outer diameter of the runner when the shaft is cold and essentially equal to the diameter of the runner during normal operating conditions;
said ring having a radially extending side face constructed to frictionally engage the housing along a limited portion of its area to create an unbalanced force on the ring which tends to retard rotation of the ring and cause an unwinding action within the ring;
said ring being radially fractured adjacent the limited engaging portion of the side face; and
means retaining the sealing ring within the housing.

4,088,330
ROTARY SHAFT END SEAL FOR APPARATUS OPERATING UNDER PRESSURE

Vitaly Petrovich Chernykh, ulitsa Kurchatova 9, kv. 4, Irkutsk, U.S.S.R.

Division of Ser. No. 403,214, Oct. 3, 1973, Pat. No. 3,951,417.
This application Jan. 5, 1976, Ser. No. 646,865
Int. Cl.[2] F16J *15/00*
U.S. Cl. 277—59 16 Claims

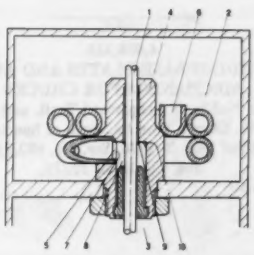


1. A rotary shaft end seal for apparatus operating under pressure comprising: a housing embracing the shaft; annular shoulders on the inner surface of said housing; annular shoulders on said shaft embraced by said housing, the number of said shoulders corresponding to the number of said annular shoulders of said housing; said annular shoulders of said housing each having an end face facing the end face of one of said annular shoulders of said shaft; sets of working members, the number of said sets corresponding to the number of said shoulders of said shaft and housing, each of the sets being arranged between said end face of said annular shoulder of the housing and the end face of said annular shoulder of the shaft facing one another; an antifriction sliding ring fitted on said shaft, which is a working member of said set, said ring being floatingly fitted on said shaft in contact with said end face of said annular shoulder of the housing; an elastic ring securely fitted on said shaft, which is a second working member of said set, said elastic ring being tightly fitted on said shaft in contact with said end face of said annular shoulder of the shaft; a metal ring which is a third working member of said set, said metal ring being located between said antifriction sliding ring and the elastic ring and loosely and slidably mounted on said shaft; chambers for sealing fluid in said housing serving for circulation of sealing fluid therethrough; each of said chambers accommodating one of said sets of the working members; passages in said housing and in said shaft serving to feed the sealing fluid into said chambers and to discharge it therefrom; said annular shoulders of said shaft and housing being alternately arranged such that the force applied to said shaft from the internal pressure in the apparatus tends to cause an axial displacement of the shaft so as to compress said set of the working members; and means applying elastic force on said shaft in the direction of its displacement resulting in the compression of said set of the working members.

4,088,331
SEALING DEVICE BY CAPILLARITY

Andre Farnier, 76, rue d'Aguesseau, Boulogne, Hauts de Seine, France

Filed Dec. 14, 1976, Ser. No. 750,500
Int. Cl.[2] B65D *53/06;* F16J *15/40*
U.S. Cl. 277—135 3 Claims

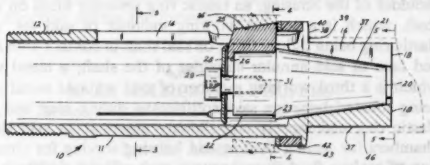


1. In a sealing device comprising:
an enclosure containing a liquid;
a pressure balancing chamber having a top wall, a bottom wall, and a side wall between said top and bottom wall;
a tube communicating between said enclosure and said pressure balancing chamber;
said tube having an inlet port to said enclosure and an outlet port to said pressure balancing chamber;
said chamber having a first opening connecting said enclosure with the interior of said pressure balancing chamber and a second opening connecting said pressure balancing chamber with an environment exterior of said enclosure;
a shaft passing from the interior of said enclosure, through said first opening, into said pressure balancing chamber; the improvement comprising:
said outlet port being disposed adjacent said bottom wall; and
said side wall being disposed a sufficient distance from said first opening so that a meniscus of said liquid formed between said first opening and said shaft cannot contact a meniscus of said liquid that forms at the juncture of said side and top walls.

4,088,332
INTERNAL EXPANDING COLLET CLAMP

Russell C. Chase, 6626 Guhn Rd., Houston, Tex. 77040

Filed Apr. 14, 1977, Ser. No. 787,331
Int. Cl.² B23B 31/40
U.S. Cl. 279—2 R 14 Claims

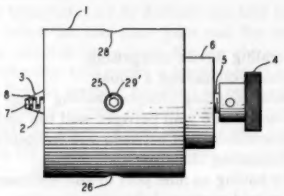


1. Internal expanding collet clamp apparatus, comprising a tubular body having circular cross sections and having a plurality of circularly spaced longitudinal slots extending from one end thereof to form a plurality of collet elements at said one end thereof, the outer surfaces of said collet elements forming a segmented cylindrical surface and the inner surfaces of said collet elements forming a segmented conically tapered surface which reduces in diameter toward said one end, a support body disposed within said one end of said tubular body having a conically beveled outer surface slidably disposed against said inner surfaces of said collet elements, plural circularly spaced insert bodies disposed through openings through said tubular body adjacent the inner ends of said collet elements and fixedly yet releasably seated at their inner sides against said support body and their outer sides having means to fixedly seat against a surrounding support surface, whereby when said tubular body is moved axially in one direction with respect to said support body said collet elements are expanded and when said tubular body is moved axially in the opposite direction with respect to said support body said collet elements are retracted.

4,088,333
JAWS, GUIDING BASE PLATES AND ADJUSTING MECHANISM FOR CHUCKS

Alfred Francis Nobile, 3 Ledgewood Trail, and Douglas Allan Nobile, 12 W. Cherry Tree La., both of Sparta, N.J. 07871

Filed May 3, 1976, Ser. No. 682,515
Int. Cl.² B23B 31/19
U.S. Cl. 279—60 12 Claims



1. A chuck suitable for use in holding an instrument along a check axis and comprising

a pair of jaws,

each of said jaws having first and second rows of spaced apart teeth, said teeth of said first row aligned at a prescribed angle to teeth of said second row, each of said teeth being in longitudinal alignment with other of said teeth in a same row,

said teeth of each said row of one of said pair of jaws longitudinally occurring alternately with respect to one another and with respect to meshable teeth of a second one of said pair of jaws,

means guidedly mounting said jaws for an axially convergent movement to effect on adjustable meshing of teeth of each of said jaws to define an adjustable corridor of a prescribed angle for holding said instrument, said mounting means including axially converging channel means, said jaws including portions guidedly mounted within said channel means,

each of said jaws having means defining at least one guide bore,

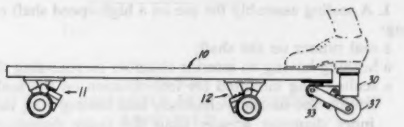
adjustment means moving said jaws, said adjustment means including a body having means defining at least one bore therein, and

pin means slidably secured in said at least one bore of each of said jaws and said body for guiding said meshing of said teeth of said jaws.

4,088,334
SKATEBOARD BRAKE

Elmer E. Johnson, 622 Locust Rd., Sausalito, Calif. 94965

Filed Mar. 25, 1977, Ser. No. 781,111
Int. Cl.² A63C 17/14
U.S. Cl. 280—11.2 9 Claims



1. In a skateboard having an elongated body and ground wheels, a brake for said skateboard comprising:

a first lever swingably secured to said body and provided with a braking surface,

a second lever swingable relative to said first lever,

a ground engaging brake wheel separate from said ground wheels and rotatably mounted on said second lever,

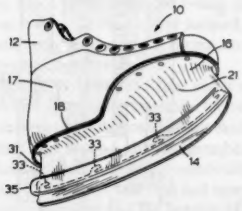
spring means urging said first lever upwardly,

and means interposed between said levers for holding said brake wheel out of engagement with the ground whereby when the first lever is urged downwardly against the urgency of said spring means, said brake wheel engages the ground and said braking surface engages the wheel.

4,088,335
SKATE CONSTRUCTION

Ian F. Norton, Toronto, and Gerald Beekenkamp, Etobicoke, both of Canada, assignors to Greb Industries Limited, Kitchener, Canada

Filed Sep. 21, 1976, Ser. No. 725,190
Int. Cl.² A63C 1/30
U.S. Cl. 280—11.18 9 Claims



1. A unitary skate component comprising a runner and supporting structure extending from said runner up to the sole of a skate boot, said structure including two spaced-apart walls of moldable, resilient material continuous thoughout the length of the skate, the walls extending substantially vertically upwardly from their junction with the runner and being substantially parallel adjacent the runner, thereby to provide columnar supporting strength for the skate, the walls at their upper portions curving smoothly upwardly and outwardly through a

substantial radius to terminate in flange portions extending generally away from each other, thereby to provide yieldable impact-absorbing regions without stress-concentration points, the two walls curving smoothly together at the front and the rear, the runner being shaped to define at least three upward projections in spaced relation along its upper edge, each extreme projection being hooked toward the middle of the runner, the walls coming together at the bottom of the supporting structure and providing material closely surrounding the upper part of the runner including all said upward projections, whereby to provide a grip between said runner and the supporting structure.

4,088,336

FOOT-WEARABLE STILT

Lesley Chapel, 9211 Haas Ave., Los Angeles, Calif. 90049

Filed Dec. 8, 1976, Ser. No. 748,489
Int. Cl.[2] A63C *17/00*
U.S. Cl. 280—11.19 **3 Claims**

1. A pair of elevating structures to be worn on the feet, each of said structures comprising a ground contact unit to which a vertically separated foot receiving unit is joined to form a unitary structure;

said ground contact unit having a horizontal base plate from which rear, side, and front walls extend upwardly to form a hollow structure, a portion of said walls further forming a hollow tower on the rear portion of said unit to which said foot receiving unit is joined, said tower extending forward under said receiving unit from the rear of said base plate approximately half the length of said receiving unit, the center line of said tower being in vertical alignment with the leg of the wearer whereby the weight of the wearer is received by the tower and transferred to the ground contact unit, the fore part of said receiving unit being cantilevered from said tower to form an open area between said fore part and the fore portion of said ground contact unit, the base plate further extending forward of the front end of said receiving unit and laterally of same for stability;

the foot receiving unit being boot-like with means to secure the foot of the wearer within said foot receiving unit.

4,088,337

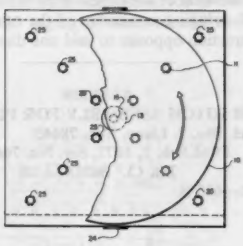
EQUIPMENT-MOVING DOLLY

Walter L. Larsen, and William L. Larsen, both of 1345 Lavenida, Mountain View, Calif. 94040

Filed Aug. 19, 1976, Ser. No. 715,925
Int. Cl.[2] B62B *1/00*
U.S. Cl. 280—79.1 R **7 Claims**

1. An equipment-moving dolly comprising: a walking beam having a rigid, planar member with a planar surface, said planar member having attached thereto approximately perpendicular to the planar surface one or more rigid, weight-bearing arms, said arms terminating in a means for attaching the walking beam to a carriage base;

a carriage base having a rigid member, said rigid member having attached thereto two or more rigid, weight-bearing struts, including a pair of outer struts, approximately perpendicular to a plane taken through the carriage base with each strut parallel to the other struts, said outer struts having a means for pivotably attaching said walking beam to said carriage base for allowing the walking beam to pivot relative to said carriage base, and having a means for attaching said struts to a roller assembly;



a roller assembly comprising two or more roller devices in tandem, having a means for individually attaching each roller device to the struts of said carriage base; and

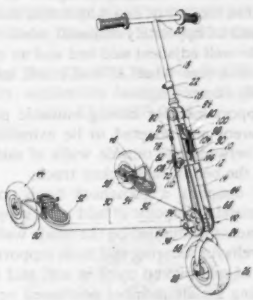
means for temporarily preventing a pivoting of the walking beam relative to the carriage base.

4,088,338

CAMBERING VEHICLE WITH CABLE STABILIZER AND EQUALIZER

Frank J. Winchell, Orchard Lake; Klaus O. Winkelmann, Troy; Jerry R. Mrlik, Birmingham; Richard E. Denzer, Bloomfield Hills, and Jerry K. Williams, Sterling Heights, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 9, 1977, Ser. No. 767,053
Int. Cl.[2] B62M *1/04*
U.S. Cl. 280—220 **5 Claims**



1. A cambering vehicle having a steering frame operatively extending at an angle with respect to a support surface for the vehicle, a pair of elongated and laterally spaced trailing arms extending generally rearwardly from said steering frame, separate contact means operatively mounted on said steering frame and on each of said trailing arms for contacting the vehicle support surface, means operatively connecting the forward ends of the trailing arms to said steering frame comprising laterally extending pivot means supporting each of said arms for swinging movement in separate planes on opposite sides of said steering frame, stabilizer and equalizer means interconnecting said steering frame and said trailing arms to selectively maintain said steering frame at a predetermined rake angle with respect to said support surface and to provide for equal and opposite swinging movement of said trailing arms in response to cambering operation of said vehicle, said stabilizer and equalizer means comprising a pair of laterally spaced primary pulleys, means coupling a first of said pulleys to a forward portion of one of said arms and a second of said pul-

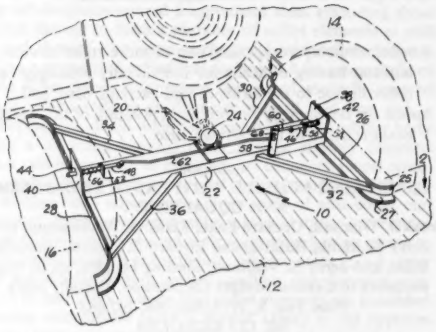
leys to a forward portion of another of said arms so that each respective arm rotates its associated pulley when said vehicle is cambered, an outer pulley rotatably supported on one side of a part of said steering frame, an inner pulley rotatably supported on the other side of said part of said steering frame, endless cable means drivingly interconnecting said pulleys so that swinging movement of one of said arms in one direction results in the equal swinging movement of the other of said trailing arms in a direction opposite to said one direction.

4,088,339

TRAILER HITCH ASSEMBLY FOR PICKUP TRUCK

Dan Sagebiel, Rte. 7, Llano, Tex. 78643

Filed Feb. 1, 1977, Ser. No. 764,659
Int. Cl.[2] B62D *53/06*
U.S. Cl. 280—423 R **7 Claims**



1. A trailer hitch assembly adapted to be removably mounted within the bed of a pickup truck, said pickuup truck including a pair of oppositely disposed wheel wells each having an outside wall adjacent said bed and an inside wall adjacent a respective rear wheel of said truck, and a frame, said hitch assembly comprising:

a main support member having movable pin means at the ends thereof and adapted to be extended in use transversely between the outside walls of said pair of wheel wells in the bed of said pickup truck;

means for coupling a gooseneck hitch connected to the approximately midpoint of said main support member;

retaining means positioned on the inside wall of each of said wheel wells for securing said main support member across the bed of said pickup truck in use, said retaining means comprising a plate member positioned on the inside wall of said wheel well and having a pin-receiving aperture formed therein; and

means for connecting said plate member to the frame of said pickup truck.

4,088,340

IMPACT ABSORBING VEHICLE COUPLING SYSTEM

Hardin Joyce, Jr., Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Nov. 7, 1975, Ser. No. 629,795
Int. Cl.[2] B60D *3/00*
U.S. Cl. 280—481 **9 Claims**

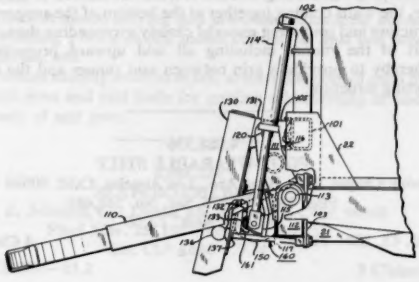
3. An impact absorbing vehicle coupling for use in tandem pushing or pulling of vehicles comprising

pushing means pivotally supported on a vehicle in a position for limited pivotal movement in a direction opposite to the direction of a pushing force applied during tandem pushing of another vehicle,

tow bar means selectively positionable for engagement by another vehicle to receive a pulling force for tandem pulling and pivotally supported on the vehicle for limited pivotal movement in the direction of a pulling force applied during tandem pulling by another vehicle,

said pushing means and said tow bar means supported on the vehicle by a common pivot,

impact absorbing means operatively connected between said



pushing means and said tow bar means compressible upon said pivotal movement thereof for dissipating impact incurred during tandem pushing and pulling, and

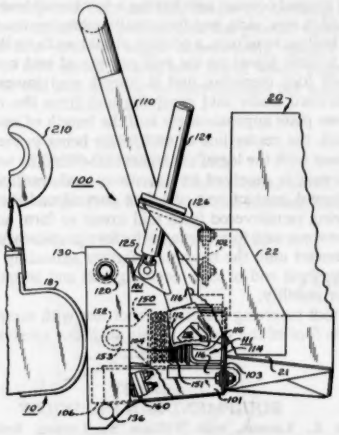
stop means conjointly engagable by said pushing means and said tow bar means for limiting the pivotal movement thereof upon compression of said impact absorbing means.

4,088,341

VEHICLE COUPLING SYSTEM

Dale Wyatt Hawk, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Dec. 29, 1975, Ser. No. 644,464
Int. Cl.[2] B60D *3/00*
U.S. Cl. 280—481 **10 Claims**



1. A vehicle coupling selectively operable for effecting tandem pushing or pulling of another vehicle comprising

pushing means carried by a vehicle in a position for applying a pushing force to another vehicle,

said pushing means operatively connected to a compressible shock absorber and supported for pivotal movement relative thereto in a direction opposed to the pushing force applied to the other vehicle for compressing said shock absorber to dampen impact incurred when applying the pushing force, and

tow bar means carried by the vehicle for receiving a pulling force applied from the other vehicle,

said tow bar means operatively connected to said compress-

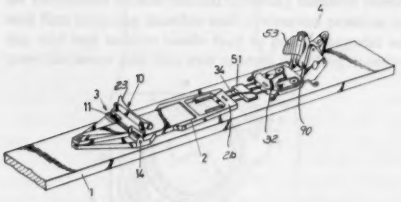
ible shock absorber and selectively operable for movement into a position for engaging a portion of the other vehicle to receive the pulling force applied thereby to dampen impact incurred when receiving the pulling force by compressing said shock absorber.

4,088,342

RELEASE BINDING FOR SKIS

Andreas Hausleithner, Prof. Penk. Str. 5, D-8102 Mittenwald, Germany

Filed Dec. 23, 1976, Ser. No. 753,682
Claims priority, application Austria, Dec. 24, 1975, 9843/75
Int. Cl.[2] A63C *11/12, 9/081*
U.S. Cl. 280—614 **13 Claims**



1. A release binding for a ski usable both for cross-country and downhill runs, comprising a front touring plate portion having a front end and an opposite rear end, a rear touring plate portion connected about a substantially horizontal first axis to said front touring plate portion for pivotal movement, mounting means on said ski for pivotally connecting said front touring plate portion adjacent its front end to the ski for pivotal movement about a substantially horizontal second axis, said touring plate rear portion having a rear end opposite to its connection to said touring plate front portion, a heel holder having a front end connected to said touring plate rear portion rear end, locking means for connecting said heel holder to the ski for downhill runs, a sole holder connected to the front end of said touring plate front portion for pivotal movement about a substantially vertical third axis relative to said touring plate, said sole holder having a blocking part seated on said touring plate front portion, said blocking part having an upstanding portion disposed above the horizontal pivotal second axis of said touring plate front portion, a blocking element disposed on the ski in front of said blocking part, blocking element mounting means for mounting said blocking element on said ski adapted to be fixed on said ski in front of said blocking part, spring means located on the blocking element mounting means biasing said blocking element against said blocking part, said blocking element being movable against the action of said spring means upon an upwardly swinging motion of both said touring plate front portion about said second axis and said sole holder and said blocking part about said substantially vertical third axis.

4,088,343

FRONT JAW

Erwin Krob, Vienna, Austria, assignor to TMC Corporation, Baar, Zug, Switzerland

Filed Dec. 9, 1976, Ser. No. 748,893
Claims priority, application Austria, Dec. 12, 1975, 9474/75
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—625 **14 Claims**

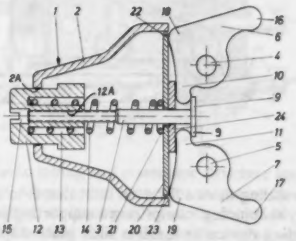
1. A front jaw of a safety ski binding for use on a ski, comprising:

housing means;

a pair of two-arm levers pivotally secured to said housing means about respective vertical axes, each arm of said pair of two-arm levers being located on opposite sides of the longitudinal center line of said housing means and pivotal between first and second positions;

an elongated rod mounted for reciprocal movement on said housing means and parallel to the longitudinal axis of said ski, said rod having means thereon cooperatively engaged with one of the arms of each of said two-arm levers;

spring means for normally urging said rod in one direction to effect a normal urging of each of said two-arm levers



toward said first position, said spring means resiliently yielding to pivotal movement of at least one of said two-arm levers toward said second position; and

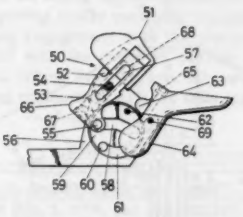
means including a portion of each of said two-arm levers for applying an additional force to said spring means in response to said pivotal movement of said one two-arm lever toward said second position to increase the magnitude of the force causing the resilient yielding to said spring means.

4,088,344

SKI BOOT HEEL RELEASE BINDING FOR SKIS

Andreas Hausleithner, Penk-Str. 5, D-8102 Mittenwald, Germany

Filed Dec. 23, 1976, Ser. No. 753,681
Claims priority, application Austria, Dec. 24, 1975, 9842/75
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—626 **8 Claims**



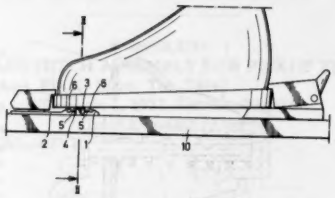
1. A ski boot heel release binding, comprising a mounting base plate having an upstanding portion, a transversely extending horizontal heel mounting pivot on said upstanding portion, a heel holder pivoted on said mounting pivot and having a sole holder portion and a treadnose portion and having an elongated slot into which said mounting pivot extends, spring means biased between said mounting pivot and the lower end portion of said heel holder, a bolt on said heel holder at a downwardly and rearwardly spaced location from the slot, a guide member rotatably mounted on said mounting base plate and having a guideway defined thereon into which said bolt extends for movement along said guideway from the opened position to the closed position, a release agent to shift said heel holder with said bolt along said guideway into the opened position.

4,088,345

SLIDING DEVICE

Heinz Korger, Niederstotzingen, Germany, assignor to Hannes Marker, Garmisch-Partenkirchen, Germany

Filed Nov. 2, 1976, Ser. No. 738,062
Claims priority, application Germany, Nov. 3, 1975, 2549203
Int. Cl.[2] A63C *11/00*
U.S. Cl. 280—636 9 Claims



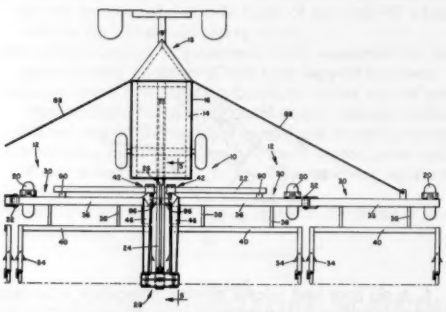
1. A sliding device for a ski boot that is to be released from a safety ski binding, comprising a supporting plate for securing the sliding device to a ski, a slide plate displaceable on said supporting plate, spring means for holding said slide plate on said supporting plate, said slide plate being displaceable on said supporting plate against the force of said spring means, one of said supporting and slide plates including support means extending into contact with a facing surface of the other of said supporting and slide plates, said support means providing a transversely extending area of contact less than the area of said one plate so that said slide and supporting plates contact each other in a limited area that extends substantially transversely of the length of the ski, said slide plate when not displaced being contacted by only said support plate and said spring means.

4,088,346

FOLDABLE IMPLEMENT

Lester Dale Schreiner, and Ronald Michael Steilen, both of Ankeny, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Mar. 3, 1977, Ser. No. 773,815
Int. Cl.[2] B62B *11/00*
U.S. Cl. 280—656 12 Claims



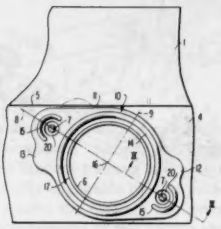
1. A foldable agricultural implement comprising: a central hopper structure adapted at its forward end to be pulled by a tractor and having a main wheel-supported frame; a transverse guide structure connected to said hopper and extending transversely to opposite sides of the fore-and-aft center line of said hopper; a pair of transverse carrier structures mounted on the guide structure to shift transversely to opposite sides of said fore-and-aft center line with each carrier structure having a vertical pivot means; tool-supporting frames on opposite sides of and extending outwardly from said fore-and-aft center line and mounted to swing on the respective vertical pivot means, said frames having rigidly projecting fore-and-aft extending portions terminating at adjacent ends; vertical pivot structure connecting said adjacent ends; and power means operatively connected to said tool-supporting frames for shifting the carrier structures in unison toward and away from said fore-and-aft center line.

4,088,347

SEALING ARRANGEMENT

Hans Brüggemann, Stuttgart, and Otto Hellemann, Wernau, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Nov. 25, 1975, Ser. No. 635,106
Claims priority, application Germany, Nov. 27, 1974, 2455986
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—24 27 Claims



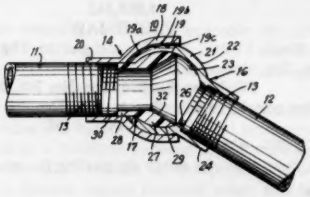
1. A sealing arrangement between a pipe flange and a screw-on surface means for the pipe flange which includes flange bolt means and a flat seal means of dissimilar sides which is installed between abutment surfaces of the pipe flange and the screw-on surface means, said flt seal means surrounding the flange bolt means, characterized in that an abutment surface means is provided at one of the two parts consisting of screw-on surface means and pipe flange which extends substantially perpendicularly to the abutment surface of the one part in the direction toward the abutment surface of the other of the two parts and which is at least approximately tangent to the outer contour of the flat seal means at a circumferential place located outside of the point of intersection of at least one line of symmetry of said flat seal means with the outer contour of the flat seal means, and in that rejection lug means for determining positioning of said flat seal means are provided at the outer contour of the flat seal means at those places which are disposed substantially opposite the tangent place between abutment surface means and outer contour of the flat seal means relative to said at least one line of symmetry.

4,088,348

UNIVERSALLY ANGULARLY ADJUSTABLE PIPE COUPLING

Sami Shemtov, Central Islip, N.Y., assignor to Gould Inc., East Farmingdale, N.Y.

Filed Feb. 9, 1977, Ser. No. 767,002
Int. Cl.[2] F16L *27/04*
U.S. Cl. 285—184 9 Claims



1. A universally angularly adjustable pipe coupling device comprising:

a first coupling member including an inner open ended

socket section with a concave inside face of circular transverse cross-section and curved longitudinal cross-section and an outer first tubular pipe engaging section;

a second coupling member including an inner open ended hollow ball section having a wall with transversely circular and longitudinally curved concave inside and convex outside faces and engaging said socket section inside face and universally rockable therein and an outer tubular pipe engaging section; and

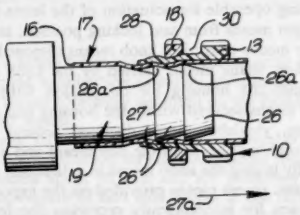
an open ended locking member engaging said ball section inside face and sandwiching said ball section wall between the confronting faces of said locking member and said socket section and being longitudinally selectively movable therein between an advanced lock position tightly engaging said ball section inside face to restrict the angular movement of said second coupling member relative to said first coupling member and a retracted position releasing said ball section inside face to permit angular adjustment between said first and second coupling members.

4,088,349

HOSE CONNECTION EMPLOYING RELATIVELY SLIDABLE PARTS

Manuel T. Guest, 9548 Bisby St., Temple City, Calif. 91780

Filed Apr. 4, 1977, Ser. No. 783,977
Int. Cl.² F16L *33/00*
U.S. Cl. 285—255 **8 Claims**



1. In an assembly to secure a hose end portion onto a tubular fitting, the hose end portion received relatively leftwardly onto the fitting which projects rightwardly, the combination with said fitting and hose end portion comprising

a. an axially extending tubular nipple initially closely received rightwardly onto the hose end portion, and spaced from the hose end, said nipple being circumferentially continuous from end to end the nipple having an annular, smooth, axially tapering, outer clamp surface oriented to taper relatively leftwardly toward the end of the hose on the fitting, the nipple pushed relatively leftwardly along the hose end portion to also extend about the fitting, and

b. a clamp ring initially receivable relatively leftwardly onto the fitting to face co-axially toward the nipple, the ring having an axially tapered bore flaring relatively rightwardly toward the nipple and displaced axially relatively rightwardly onto the nipple outer clamp surface in compressively clamping relation therewith, thereby to tightly and radially clamp the hose to the fitting,

c. the length of the nipple outer clamp surface taper being substantially greater than the length of the ring bore taper,

d. the ring having an annular flange projecting radially inwardly from said flaring bore to locally constrict the nipple,

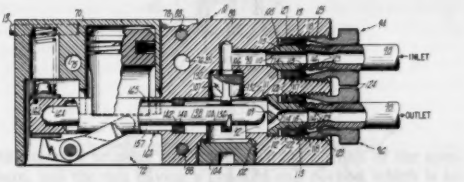
e. the nipple and hose end portion consisting of non-metallic molded plastic material.

4,088,350

PLASTIC TUBING CONNECTOR

Leighton Lee, II, Guilford, Conn., assignor to The Lee Company, Westbrook, Conn.

Continuation of Ser. No. 485,789, Jul. 5, 1974. This application Feb. 13, 1976, Ser. No. 658,074
Int. Cl.² F16L *21/06*
U.S. Cl. 285—322 **7 Claims**



1. In a soft plastic tubing and connector structure assembly, the improvement wherein the connector structure comprises an axially extending male connector with a coaxial axially outwardly tapered conical male sealing surface at an outer end thereof, wherein the soft plastic tubing has an end with a coaxial conical female sealing surface forming an annular axially outwardly internally tapered lip at the end of the tubing, the conical male sealing surface being harder than the plastic tubing and the male connector and tubing having outer cylindrical surfaces of substantially the same diameter, and wherein the connector structure further comprises retaining means for holding the plastic tubing and male connector in axial alignment with the respective female and male conical sealing surfaces in sealing engagement and for holding the outer cylindrical surface of said lip at the end of the tubing against radial expansion beyond substantially the same diameter as that of the male connector, the retaining means comprising a tubing retaining collar having a generally cylindrical bore closely surrounding the male connector and the internally tapered lip of the plastic tubing and defining with the conical male sealing surface a fixed generally wedge shaped annulus for receiving and retaining the annular internally tapered lip of the plastic tubing against substantial outward radial expansion and means for axially urging the internally tapered lip into the generally wedge shaped annulus for urging the conical female and male sealing surfaces of the tubing and male connector into sealing engagement comprising axially outwardly extending gripping fingers in gripping engagement with the plastic tubing and intergrally formed with the collar to provide a collet for urging the plastic tubing into the generally wedge shaped annulus for sealing engagement with the male connector.

4,088,351

MACRAME FRAME

Jeanne Roth, Rte. 1, Box 53, Eolia, Mo. 63344

Filed Dec. 1, 1976, Ser. No. 746,247
Int. Cl.² B65H *69/04*
U.S. Cl. 289—18 **3 Claims**

1. A macrame frame comprising:

(a) a pair of elongate side frame members having upper and lower portions said upper portions being disposed in intersecting, inclined relation to each other,

(b) an upper pivot connection extending between said side members at said intersection,

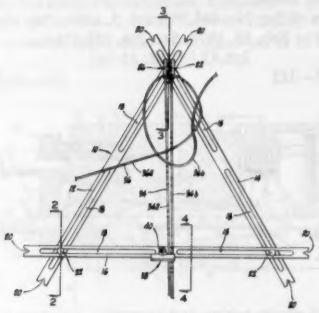
(c) holding means adapted to receive a looped macrame cord,

(d) a lower elongate member having clamping means adapted to releasably clamp said macrame cord, said lower member cooperating with said side members to define a substantially triangular open work space,

(e) a pair of lower pivot connections each extending between said lower member and an associated side member, and

(f) said lower member and said side members being slotted

lengthwise to receive said lower pivot connections therethrough and permit relative sliding movement of said



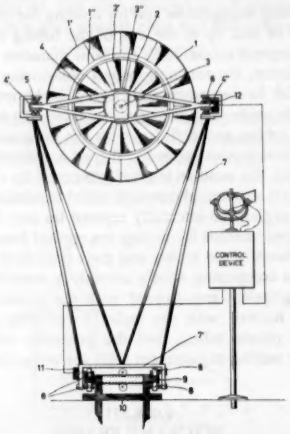
lower member longitudinally of said inclined side members to selectively determine the size of the work space.

4,088,352

WIND-DRIVEN POWER PLANT

Alberto Kling, Am Hugel 14, 8136 Percha, Germany

Filed Mar. 25, 1975, Ser. No. 561,709
Claims priority, application Germany, Feb. 14, 1975, 2506160
Int. Cl.[2] F03D 7/02
U.S. Cl. 290—55 **22 Claims**



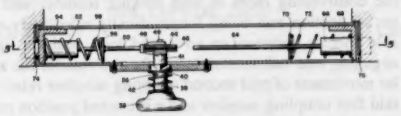
1. A wind-driven power plant comprising at least one rotor having a gyration axis, a base, a carrier construction pivotable on said base about an upstanding axis, a support structure pivotable on said carrier construction about a tilt axis in a manner permitting precession of said rotor, said rotor being rotatably supported by said support structure and rotatable about said gyration axis, an adjusting device for pivoting said carrier construction on said base in response to changes in horizontal wind direction, a setting device for exerting torque directly or indirectly on the rotor gyration axis or on the rotor which has a torque vector component extending perpendicularly to the rotor gyration axis and perpendicularly to the upstanding axis, said tilt axis intersecting both the rotor gyration axis and the upstanding axis and forming an angle with both, and a control device for controlling the mangitude of movement of said adjusting and setting devices in response to the rotor rotational speed and the desired wind direction orientation to be exerted on the rotor in in accordance with the torque to be exerted by the upstanding axis adjusting device and in compliance with the laws of gyroscopic precession.

4,088,353

DOOR SECURITY LOCK MEANS WITH PANIC KNOB

Kirk J. Meyer, 5917 E. 33rd Ct. Apt. 4, Tulsa, Okla. 74135

Filed Jun. 27, 1975, Ser. No. 591,177
Int. Cl.[2] E05C 1/12, 9/16
U.S. Cl. 292—36 **1 Claim**



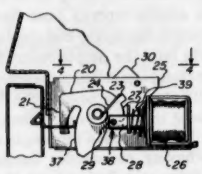
1. In combination with a door mounted in a door frame, door locking means comprising a housing, means for securing the housing to one face of the door, actuator means extending through the housing, a lever member disposed within the housing and operably connected to the actuator means, locking pin means operably connected directly to the lever member and slidably extending through aperture means provided in the housing, said actuator means being rotatable in one direction for actuation of the lever member to move the pin means outwardly through said housing aperture means and into aperture means provided in the door frame for locking of the door, yieldable means cooperating with the housing and pin means for constantly urging the pin means toward an unlocked position, means cooperating between the housing and actuator means for retaining the pin means in said locked position, said actuator being operable for actuation of the lever member to release the pin means from said locking position, and wherein the actuator means comprises knob means disposed exteriorly of the housing, shank means carried by the knob means and extending into the housing for connection with the lever means, hub means secured within the housing and around the shank means, yieldable means disposed around the shank means and anchored between the hub means and knob means for constantly urging the knob means in a direction away from the hub means, recess means provided on the exposed face of the hub means for intermittently receiving the lever means therein, said shank means being movable against the force of the yeildable means by the knob means for disengaging the lever means from the recess means to provide said unlocked position, and said knob being rotatable in one direction for actuation of the lever member to provide said locking position.

4,088,354

DOOR LOCKING MECHANISM FOR SELF-CLEANING OVEN

Charles W. Kolendowicz, Buffalo, Minn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Oct. 7, 1976, Ser. No. 730,525
Int. Cl.[2] E05C 19/16
U.S. Cl. 292—201 **6 Claims**



1. In a domestic cooking appliance of the type including an oven, an oven door hingedly mounted on said appliance, and

wherein said appliance includes a mode of operation for accomplishing self-cleaning of said oven by pyrolysis, the improvement comprising:

door latch means selectively moveable between a first storage position and a second operating position and including an aperture, door locking means for engaging said latch means when said latch means is in said second operating position and said door is closed, said lock means including a rotatable cam assembly having a cam follower, said latch means adapted to engage and rotate said cam assembly upon closing of said door when said latch means is in said second operating position causing said cam follower to pass through said aperture in said latch means to hold said door closed, whereby said lock means is not engaged when said door is closed with said door latch means in its first storage position.

4,088,355

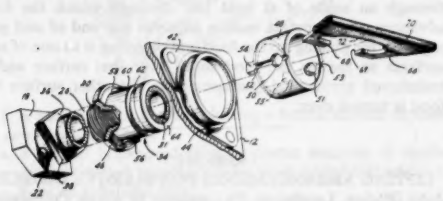
QUICK-ACTING FASTENER ASSEMBLY

Ervin J. Dey, Santa Fe Springs, Calif., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Apr. 1, 1977, Ser. No. 783,534

Int. Cl.² E05C *5/04*

U.S. Cl. 292—251 **20 Claims**



1. A quick acting fastener assembly for securing a first member to a second member the assembly comprising:

securing means rotatingly mounted on the first member;

adjustment means;

stud means mounted on the second member, including means carried thereon for allowing limited rotation of said stud means about its axis and for positively restricting axial movement of said stud means in one direction relative to the second member, said stud means having adjacent both ends thereof means for cooperating with said securing means and said adjustment means to allow relative axial movement therebetween; and

biasing means operatively disposed between the second member and said adjustment means for biasing said stud means to an axial position wherein said rotation limiting means bears upon the second member restricting further axial movement in said one direction when said securing means is disengaged from said stud means;

whereby said securing means is adapted to engage one end of said stud means to secure the first member to the second member and whereby in the secured position said adjustment means bears upon the second member to limit axial movement of the stud means in the other direction.

4,088,356

PIVOTAL CONNECTIONS

Philip Swingewood Jeavons, Birmingham, England, assignor to Wilmot-Breeden Limited, Birmingham, England

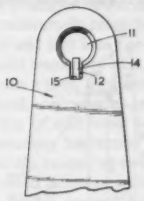
Filed Sep. 16, 1976, Ser. No. 724,067

Claims priority, application United Kingdom, Sep. 16, 1975, 37908/75

Int. Cl.² E05C *13/00*

U.S. Cl. 292—359 **4 Claims**

1. The combination of a lever forming part of a door latch operating mechanism and a metal rod pivotally connected thereto, the lever being formed as a plastics moulding and including an aperture of key-hole shape in cross-section which comprises a main cylindrical portion and a projecting portion afforded by a parallel-sided slot, said plastics moulding including, as an integral part thereof, a web or fin extending from the base of said parallel-sided slot and of such length that the free



end thereof projects into the cylindrical portion of the aperture, and the rod having a cranked end portion which is inserted into the aperture so as to be acted upon by the web or fin which thereby serves to restrain vibration of the cranked end portion of the rod relative to the lever.

4,088,357

BUMPER FOR MOTOR VEHICLES

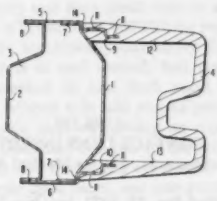
Wolfgang Klie, Korntal; Hubert Hutai, Grafenau, and Wolfgang Fischer, Leinfelden, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 22, 1975, Ser. No. 607,035

Claims priority, application Germany, Aug. 24, 1974, 2440708

Int. Cl.² B60R *19/08*

U.S. Cl. 293—98 **31 Claims**



1. A composite bumper structure for vehicles comprising in combination

an impact force absorbing body means formed of an synthetic plastic material, said body means being configured with an endwall and a plurality of sidewalls defining a hollow cavity open at one end and closed at another, said sidewalls extending in planes approximately transverse with respect to the plane of the closed end, and

bearer means securely arranged on relatively fixed vehicle parts for holding said hollow body means, said bearer means including anchoring means, plural sidewalls of said body means being formed integrally about portions of said anchoring means for connecting said body means and said bearer means into a unitary structure, and said anchor means being configured so as not to extend inwardly across the planes of said sidewalls thereby leaving access to the entire cavity through said open end unobstructed.

4,088,358

WASHER ATTACHMENT FOR A VEHICLE HEADLIGHT

William A. Hirsch, 1566 Tralee Dr., Dresher, Pa. 19025

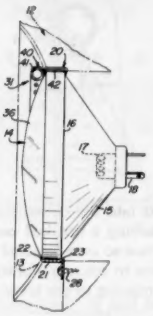
Filed Oct. 26, 1976, Ser. No. 735,377

Int. Cl.² B05B *1/10*

U.S. Cl. 239—284 A **2 Claims**

1. A washer attachment for a vehicle headlamp including an envelope and a split mounting ring releasably clamped circumposed about the envelope, said attachment comprising a fluid conduit of circular cross section configured to extend arcuately partially along and in conforming relation with an upper

region of the circumference of said envelope adjacent to said mounting ring, a plurality of spaced mounting tabs, each having a securing end portion secured to a top region of said conduit and having a laterally extending portion extending beyond one side of said conduit, said laterally extending portions of said mounting tabs being interposable between the envelope and mounting ring for mounting the conduit relative to the envelope, said conduit having a fluid inlet for connection to a fluid source, and fluid outlet means along the underside of said conduit for discharge of a cleaning fluid across the envelope.

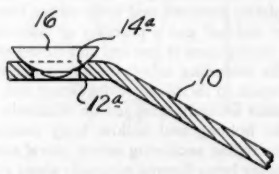


4,088,359

CONTACT LENS INSERTER

Richard S. Buchanan, Jr., Elmira Medical Arts Center, Elmira, N.Y. 14901

Filed Jan. 21, 1977, Ser. No. 760,976
Int. Cl.[2] A61F 9/00
U.S. Cl. 294—1 CA **1 Claim**



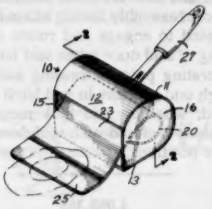
1. An instrument for mounting soft contact lenses on the eye of a contact lens user comprising a handle portion having two opposed flat surfaces and a bulbous central portion and tapered neck portions at the opposed extremities of said handle portion, loop elements disposed at the extremities of said handle portion connected to said tapered neck portions, further including beveled surfaces on an inner portion of each loop element to provide a nesting surface for the soft contact lenses on said loop elements, and said loop elements are each offset relative to said flat handle portion surfaces at different angles but both less than 90° to provide a different angle of attack for lens insertion, and in which the bulbous central portion has a width somewhat greater than a diameter of said loop elements and said tapered neck portions have a width somewhat less than the diameter of said loop elements so as to provide a grasping area which can accommodate a portion of the user's hand.

4,088,360

KITCHEN UTENSIL

Charmaine A. Jenkins, and Garry W. Jenkins, both of P.O. Box 635, Burlington, Vt. 05401

Filed May 3, 1976, Ser. No. 682,321
Int. Cl.[2] A47J 43/28; A23N 15/00
U.S. Cl. 294—8 **6 Claims**



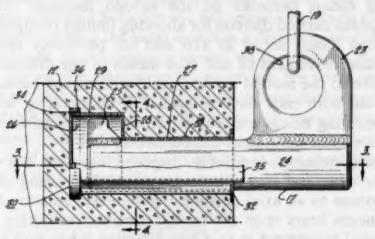
1. A kitchen utensil for turning food over by a sliding action instead of a flipping action, which comprises an outer shell having a concave inner surface, separate therefrom an inner element having a convex outer surface at least a part of which opposes and is spaced from at least a part of said concave surface so as to form between them a passageway curved through an angle of at least 180° through which the food advances, and a spatula section adjacent one end of said passageway for picking up the food and directing it to one of said surfaces so that as the food slides over that surface and is transferred across said passageway to the other surface the food is turned over.

4,088,361

LIFTING ARRANGEMENTS FOR MASSIVE OBJECTS

John Ditcher, Langhorne, Pa., assignor to A-Lok Corporation, Trenton, N.J.

Filed Oct. 6, 1976, Ser. No. 730,007
Int. Cl.[2] B66C 1/66
U.S. Cl. 294—89 **6 Claims**



1. A lifting asembly for use in handling massive concrete castings by means of a pair of lifting rods adapted to be inserted in transverse sockets in opposite walls of such casting, each of said assemblies comprising a rod with a single, laterally projecting key adjacent one end, and having a single ear spaced from the key and projecting from said rod in the same plane as the plane of the key, both of said rod and key members being configured to cooperate with a massive member of concrete having two transversely extending mutually aligned sockets therein, each defined by a shell of molded material embedded in said massive member, each of which shells comprises a tubular portion extending horizontally inwardly from an outer face of said massive member, each also having a single lateral channel part extending lengthwise along the outer periphery of the tubular portion of each shell and each channel part having its open side in communication, throughout its length, with the interior of said tubular portion; each of said tubular portions being dimensioned to loosely receive one of said rods and each of said channels being configured to pass one of said keys; the tubular portion of each shell terminating in a parti-cylindrical

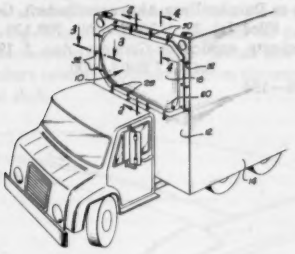
housing closed by a snap-fitted end plate and being concentric with the axis of the tubular portion and configured to accommodate angular movement of the said key on rotation of said rod, whereby to ensure that, after the rod has been inserted in the tubular portion of the shell, lifting stress applied to the ear will effect rotation of the rod until the key is so positioned as to be secure against withdrawal so long as tension on the cable is maintained.

4,088,362

INFLATABLE AERODYNAMIC NOSE CONE

Carlos A. Mollura, 2824 Del Oro Pl., Fullerton, Calif. 91733

Filed Sep. 16, 1976, Ser. No. 723,756
Int. Cl.[2] B62D *35/00*
U.S. Cl. 296—1 S **2 Claims**



1. A nose cone for a vehicle having a frontal surface exposed to aerodynamic forces:

a. a pair of juxtaposed plies of plastic material of similar contour sealed together along their peripheral edges to form an inflatable bag;

b. reinforcing webbing interposed between the plies for strengthening the edges;

c. valve means for admission and capture of inflation air to said bag to cause said bag to assume a rounded configuration;

d. a first series of discrete fastener elements extending in spaced relationship along the said peripheral edges;

e. a second series of discrete companion fastener elements attached to said frontal surface in an array to register with said first series of fastener elements; and

f. said fastener elements of said first and second series being detachable when said bag is deflated, inflation of said bag causing said edges to contrict and thereby to impose a centripetal stress upon said second series of fastener elements thereby to lock said bag in place.

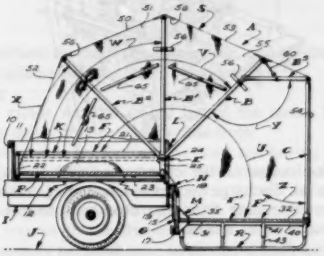
4,088,363

TRUCK CAMPER TENT

Dean Palmer, 24001 S. Avalon, Carson, Calif. 90745

Continuation-in-part of Ser. No. 554,411, Mar. 3, 1975. This application Dec. 16, 1975, Ser. No. 641,302
Int. Cl.[2] B60P *3/34*
U.S. Cl. 296—23 MC **9 Claims**

1. A camping attachment for a pick-up truck having front and rear ends, an elongated, longitudinally extending, upwardly and rearwardly opening utility bed at said rear end, said bed defined by front and side walls with upper edges and a bottom wall, a transversely extending tailgate having front and rear surfaces and top and bottom edges, and pivotal hinge means between said bottom edge and the rear of said bed whereby said tailgate may pivot 180° between a first, bed closing position wherein said top edge is substantially directly above said bottom edge, and a second, bed opening position wherein said top edge is substantially directly beneath said bottom edge, said attachment comprising: an elongated, flat, horizontal, primary frame unit adapted to be positioned in free, coextensively overlying engagement with said bottom wall; upwardly disposed stop means adapted to be fixed in vertically spaced relationship above said primary frame unit adjacent said front and side walls of said bed; pivot means mounted on opposite, rear sides of said primary frame unit adjacent said side walls of said bed, said pivot means defining a transverse axis spaced above said primary frame unit and below said stop means; at least three U-shaped bows, each of said bows having parallel legs and a transversely extending base connecting said legs, the free ends of said legs being pivotally mounted on said pivot means about said transverse axis, a first one of said bows being pivoted between a first, forwardly extending horizontal position and a second, rearwardly and upwardly extending position, a second one of said bows being pivoted between a first, forwardly extending horizontal position and a second vertically and upwardly extending position and a third one of said bows being pivoted between a first forwardly extending horizontal position and a second forwardly and upwardly extending position; a flat, deck panel; means adapted for releasably mounting said deck panel on said tailgate in cantilever



relationship, whereby said deck panel rests on said stop means when said tailgate is in said first, bed closing position, and said deck panel extends horizontally outwardly from said truck when said tailgate is in said second, bed opening position; support means mounted on said deck panel to engage the ground when said tailgate is in said second position; a flexible fabric, tent skin, said skin comprising an elongated central portion having a front end secured to the front end of said primary frame unit and a rear end secured to the outwardly extending end of said deck panel, and side portions connected to said central portion and secured to the side edges of said primary frame unit and said deck panel; and coupling means securing said bows to said central portion at predetermined positions therealong whereby said skin lies in folded position and said bows lie in said first horizontal position when said tailgate is in said first, bed closing position, and said skin is held in a taut, unfolded position by said bows being positioned in said second positions, respectively, when said tailgate is in said second, bed opening position.

4,088,364

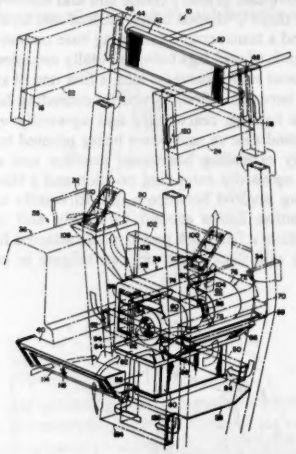
ENVIRONMENTAL CONTROL SYSTEM AND CAB COMBINATION

Charles George Termont, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Oct. 26, 1976, Ser. No. 735,382
Int. Cl.[2] B62D *27/00*
U.S. Cl. 296—28 C **8 Claims**

1. An environmental control system and cab combination, comprising: a cab framework including at least one upper horizontally disposed tubular member having opposite open ends; fresh air inlet duct means joined to the tubular member for conveying air from outside the cab into the tubular member; a pair of upright tubular support posts respectively joined to and respectively provided with a pair of inlet openings in communication with the opposite open ends of the tubular member; said posts further being respectively provided with a pair of outlet openings; an operator seat support structure defining a hollow chamber; air blower means mounted in said

chamber and having inlet and outlet means; air supply duct means defined at least in part by said chamber and extending between the pair of outlet openings of the support posts and blower means inlet; air conditioning coil means and air heating



coil means located in the chamber in said air supply duct means; and air discharge duct means, including conditioned air outlet means leading from the chamber connected to the blower means outlet means.

4,088,365

PORTABLE STORAGE APPARATUS AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Donald J. Johnson, 28448 Cherry, Box 361, Romulus, Mich. 48174

Filed Apr. 14, 1976, Ser. No. 677,050
Int. Cl.² B60R *7/00*
U.S. Cl. 296—37.6 **7 Claims**

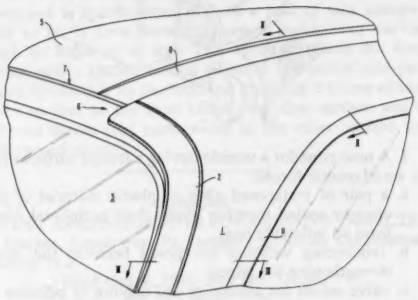
2. A portable storage apparatus comprising:
a box-shaped main body portion defined by a top wall, side walls, and a substantially horizontal bottom wall;
elongated substantially vertical support members secured at the upper ends thereof to suitable mounting means for supporting said main body portion adjacent said bottom wall thereof and at the lower ends thereof to a fixed external structure;
said fixed external structure comprising a permanently disposed suitable horizontal surface;
said vertical support members comprising a plurality of vertical support members having the lower ends thereof threaded;
suitable threaded flanges provided in said suitable horizontal surface to receive said threaded lower ends of said vertical support members;
said mounting means including supporting plates with flanged edges to support said main body portion adjacent said bottom wall of said main body portion;
latch means provided near the top edge of said main body portion for securing to an external ceiling structure; and
said ceiling structure being provided with apertures for receiving said latch means to provide horizontal support for said apparatus.

4,088,366

BAR PROJECTING FROM WINDSHIELD COLUMN OF A MOTOR VEHICLE

Josef Gallitzendorfer; Peter Pfeiffer; Johann Tomforde, all of Sindelfingen, and Hans Gotz, Boblingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Jul. 27, 1976, Ser. No. 709,120
Claims priority, application Germany, Aug. 2, 1975, 2534686
Int. Cl.² B60J *9/00*
U.S. Cl. 296—154 **12 Claims**



1. A strip-like structure projecting from a windshield column of a motor vehicle which forms a water-collecting channel open so as to receive water flowing off the windshield pane, within which the water rising during the drive is conducted in the direction toward the vehicle roof, characterized in that a strip-like profile means forming a water-collecting channel is extended at its upper end around toward the top side of the windshield, and in that the water-collecting channel formed by said strip-like profile means terminates in a channel extending in the roof approximately parallel to the center longitudinal axis of the motor vehicle, said water collecting channel being positioned relative to said channel means in a manner enabling water to flow from said water-collecting channel into said channel extending in the roof.

4,088,367

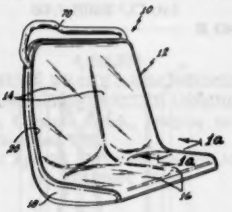
VEHICLE SEAT ASSEMBLY

Thomas Carl Atkinson, Chula Vista, Calif., and Clifford C. Fay, Uniondale, Pa., assignors to Rohr Industries, Inc., Chula Vista, Calif.

Filed Jun. 20, 1977, Ser. No. 808,074
Int. Cl.² A47C *1/12*
U.S. Cl. 297—457 **10 Claims**

1. A cantilevered seat for a transit vehicle comprising:
a seat shell molded from structural foam plastic, said seat shell having contoured into its front surface two seat recess areas and two back recess areas, said seat shell being an integral member having a front panel with a laterally extending flange formed around its periphery,
said rear surface of said seat shell having a plurality of integrally molded horizontal, diagonal and vertical structural rib members and substantially in the center of said seat shell is a major vertical structural rib member, the matrix

formed by said vertical, diagonal and horizontal rib members being symetrical about said major vertical rib member whereby said seat shell can be used as either a right hand mounted or a left hand mounted cantilevered seat



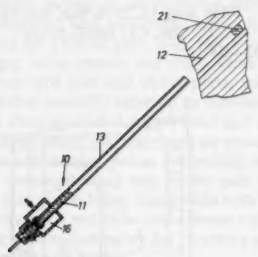
a back pan molded from structural foam plastic, said back pan having integrally molded channels on its inwardly facing surface for receiving said vertical and horizontal rib members extending outwardly from the rear surface of said seat shell.

4,088,368

METHOD FOR EXPLOSIVE BREAKING OF HARD COMPACT MATERIAL

Erik Volmar Lavon, Saltsjö-Boo, and Levi Johannes Karlfors, Nacka, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Sep. 7, 1976, Ser. No. 720,734
Claims priority, application Sweden, Sep. 19, 1975, 7510558
Int. Cl.[2] E21C *37/12*; F42D *3/04*
U.S. Cl. 299—13 11 Claims



1. A method of breaking a hard compact material, especially rock, comprising:

pre-drilling at least one hole in the material to be broken;

locating an explosive in said hole;

forming a body of substantially incompressible fluid and having a cross section area substantially corresponding to the free cross section area of said hole;

accelerating said body and directing same into said hole for impacting the explosive in said hole to initate said explosive by means of the pressure pulse which is generated in said body when same impacts the explosive; and

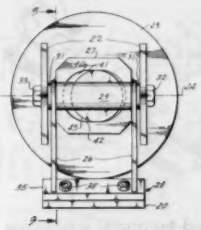
stemming said drill hole by at least a substantial portion of said accelerated fluid body to delay leakage of blasting gases, which are generated during the explosion, out of the drill hole before the material is broken.

4,088,369

OSCILLATING MECHANISM FOR STRIPPING MACHINE

Earle F. Prater, Long Beach, Calif., assignor to Roofing Equipment, Inc., Denver, Colo.

Filed Jan. 6, 1977, Ser. No. 757,209
Int. Cl.[2] A47L *11/12*
U.S. Cl. 299—37 8 Claims



1. A machine for stripping carpet, tile, and similar objects which are adhered to a surface, comprising:

a frame;

a drive motor secured to the frame, the motor having a rotary drive shaft extending therefrom;

a cam secured to the motor drive shaft and having a peripheral surface which is eccentric with respect to the drive-shaft axis of rotation;

a bracket pivotally mounted on the frame for oscillation with respect to the frame about a pivot axis which is substantially perpendicular to the drive-shaft axis of rotation;

a stripping blade mounted at a lower end of the bracket; and

a follower block rigidly secured to the bracket, the block having an oblong opening therein to receive the cam, the drive-shaft axis of rotation extending through the opening, the longer axis of the opening being substantially parallel to the bracket pivot axis and being sufficiently large that the ends of the opening remain clear of the rotating cam, the opening having upper and lower side surfaces which are substantially straight and parallel, the side surfaces being spaced apart by substantially the outside diameter of the cam whereby the cam makes a rotatable slip fit between the side surfaces and the bracket is oscillated about the pivot axis to reciprocate the stripping blade.

4,088,370

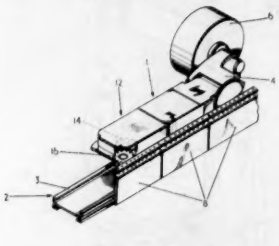
HAULAGE ARRANGEMENTS FOR MINERAL MINING MACHINES

William Joseph Jarvis, Bestwood, England, and Terence Smith, Calgary, Calif., assignors to Coal Industry (Patents) Limited, London, England

Filed Sep. 4, 1975, Ser. No. 610,394
Claims priority, application United Kingdom, Oct. 4, 1974, 43103/74; Feb. 19, 1975, 06872/75; Feb. 19, 1975, 06971/75
Int. Cl.[2] E21C *29/00*
U.S. Cl. 299—43 23 Claims

1. A mining arrangement comprising a machine or vehicle adapted to haul itself to and fro along an elongated track assembly including abutments and constituted by a plurality of track components arranged longitudinally end to end along the machine or vehicle path, the mining machine or vehicle including a body, a drive motor, at least one pinion supported by the body and drivably connected to the drive motor, and a retaining member for engaging the track assembly to retain the machine to the track assembly, the retaining member being fixed relative to the body, each track component comprising a rigid assembly providing a series of fixed abutments for sequential drivable engagement by the driven pinion, and connector means connected to the track members adjacent to the ends of the series of fixed abutments for securing the track component

to adjacent rack components, and further connector means provided remote from the first mentioned connector means, the connector means substantially preventing relative longitudinal movement of the adjacent ends of the two track components in the vicinity of the connector means but permitting



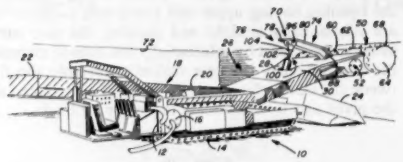
limited vertical and horizontal articulation of the connected track components, and restricting articulation of the track components to within a preselected maximum amount, the connector means ensuring that adjacent fixed abutments are maintained in pitch for engagement by the driven pinion.

4,088,371

BOOM STABILIZER FOR AN UNDERGROUND MINING MACHINE

Maurice K. LeBegue, Argillite, and Charles R. Herron, Russell, both of Ky., assignors to National Mine Service Company, Pittsburgh, Pa.

Filed Feb. 1, 1977, Ser. No. 764,632
Int. Cl.[2] E21C *27/24*
U.S. Cl. 299—76 **9 Claims**



1. A boom stabilizer for an underground mining machine comprising,

a mobile body portion,

a boom member pivotally secured to said body portion and extending forwardly therefrom,

a material dislodging apparatus rotatably mounted on the front of said boom member,

cutting elements secured to said material dislodging apparatus and extending outwardly therefrom,

stabilizing means pivotally connected to said boom member adjacent to said material dislodging apparatus for engaging the mine roof to maintain said cutting elements displaced from engaging said mine roof as said dislodging apparatus sumps into the mine face adjacent said mine roof, and

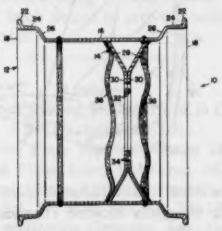
actuator means connected to said stabilizing means and mounted on said boom member for raising and lowering said stabilizing means, said actuator means operable to raise a portion of said stabilizing means to a location above said cutting elements so that said stabilizing means prevents said cutting elements from dislodging material from the mine roof.

4,088,372

UNITARY WHEEL FOR INDUSTRIAL USE

James Wilson Jewett, and Terry Wayne Beemer, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

Filed May 21, 1976, Ser. No. 688,675
Int. Cl.[2] B60B *1/06*
U.S. Cl. 301—63 R **1 Claim**



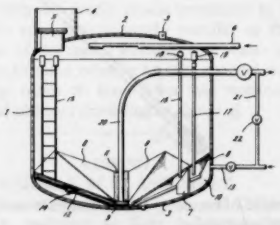
1. A unitary wheel construction comprising: a rim including a cylindrical central part having opposite ends to which first and second annular flanges are respectively joined by means of first and seond circular seams of weld material; a drive disk structure located inside said rim and including first and second disks; said first disk having an outer peripheral edge continuously engaged with the rim through 360° of contact and being convoluted and crisscrossing said first circular seam of weld material; said peripheral edge being joined to said central part and first annular flange by a continuous third seam of weld material; and said second disk having peripheral edge spaced from the peripheral edge of said first disk and engaged continuously with the rim through 360° of contact and joined to the central part by means of a continuous fourth seam of weld material located approximately halfway between the opposite ends of the central part.

4,088,373

HIGH VOLUME PNEUMATIC TANK

Charles F. White, Houma, La., assignor to TBW Ind. Inc., Houma, La.

Filed Aug. 11, 1976, Ser. No. 713,525
Int. Cl.[2] B65G *53/38*
U.S. Cl. 302—53 **1 Claim**



1. In a high volume pneumatic tank, vertical, cylindrical walls and concave-convex heads mounted on each end of said walls, horizontally and vertically inclined slope sheets mounted adjacent the head forming the bottom of the tank, an air slide mounted between the slope sheets and pourous slide plates mounted on said slides, a load inlet line and a load discharge line mounted in said tank, said discharge line extending from a point adjacent said slide plates to the point of ultimate discharge, an air inlet line beneath said slope sheets and pressure equalizing means for equalizing the pressure in the tank on each side of said slope sheets consisting of two conduits extending from beneath the slope sheets to a point above the content level inside the tank, one of said conduits permitting

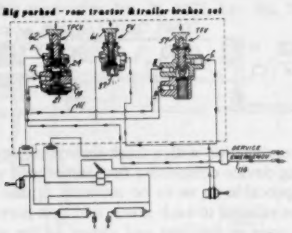
pressure flow in one direction and the other conduit permitting pressure flow in the opposite direction, said equalizing means has a filter to prevent pulverulent material from moving from one side of said slope sheets to the other, and means for maintaining a preselected pressure differential beneath said slope sheets.

4,088,374

AIR PRESSURE BRAKE ARRANGEMENT FOR TRACTOR AND SEMI-TRAILER COMBINATIONS

Robert M. Gute, Corunna, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Apr. 25, 1977, Ser. No. 790,309
Int. Cl.[2] B60T *15/48*
U.S. Cl. 303—9 9 Claims



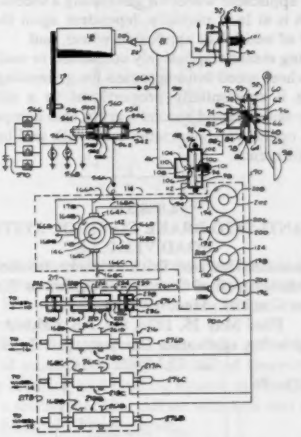
1. A tractor and trailer air brake system comprising:
tractor-mounted air-pressure supply means;
pneumatic brake actuators on the tractor;
pneumatic brake actuators on the trailer;
at least one tractor axle having brake release pressure chambers and all actuators having brake actuating pressure chambers;
a tractor-to-trailer supply line connected with said brake release chambers of the trailer actuators;
a tractor-to-trailer service line placing said supply means in communication with said brake actuating pressure chambers of the trailer actuators;
a four-port tractor protection control valve (TPCV) comprising a housing having an air-receiving inlet port, an outlet port connected with said trailer supply line, a relay air port and an air exhaust port; said TPCV comprising manual plunger valve means and relay valve means in tandem between said inlet and outlet ports, said plunger valve means being movable between an outward position against a seat closing off said supply port and an inward position against a second seat providing air passage to said relay valve means, a relay piston comprising an exhaust valve means communicating said outlet port with said exhaust port, said piston being engageable with said relay valve means to open it and close said exhaust valve means, and a relay air port and chamber for receiving and applying air pressure to said piston;
a three-port parking valve (PV) having a housing providing a first port, a second port, an exhaust port, said PV comprising manual plunger means movable between an outward position closing said first port and placing said second port in communication with said exhaust port, and an inward position placing said first and second ports in communication while closing said exhaust port;
a three-port trailer fill valve (TFV) having a housing providing a third port connected with said pressure supply means and said first port of the PV and said inlet port of the TPCV, a fourth port connected with said TPCV relay air port, and a fifth port connected with the PV second port and said brake release chambers of the tractor; said TFV comprising a manual plunger movable between an outward position in which the third port communicates with the fourth port and an inward position in which said fourth port communicates with said fifth port.

4,088,375

AUTOMATIC SKID AND SPIN CONTROL SYSTEM FOR VEHICLE BRAKES AND METHOD

Laddie A. DePas, Sr., Louisville, Ky., assignor to M. L. Miller, Louisville, Ky.

Filed Dec. 15, 1975, Ser. No. 640,865
Int. Cl.[2] B60T *8/02, 8/10*
U.S. Cl. 303—96 43 Claims



1. A brake pressure control valve comprising
a housing defining first and second chambers and an inlet orifice adapted for introducing a fluid into said first chamber,
a movable diaphragm defining a hole therethrough, disposed in said second chamber and attached to said housing in an air tight manner to divide said second chamber into third and fourth chambers,
a movable plunger projecting partially inside said housing and fourth chamber toward one side of said diaphragm in registry with said hole,
mounting means attached to the other side of said diaphragm and adapted to allow a fluid to flow through said hole,
a tapered valve seat formed by said housing and defining a tapered orifice between said first and third chambers opposite said other side of said diaphragm,
a valve needle tapered in conformity with said seat and disposed in said first chamber in registry with said tapered orifice, said needle being attached through said orifice to said mounting means,
biasing means disposed in said housing tending to maintain said diaphragm in a retracted position such that said needle is normally in air tight closing engagement with said tapered orifice, said valve needle being adapted to disengage said tapered orifice in opposition to said biasing means when said plunger is forced against said diaphragm to move said diaphragm to an extended position, said plunger being adapted to close said hole in an air tight manner when said plunger is moved against said diaphragm, said housing defining a vent port for venting a fluid from said fourth chamber and housing, said housing further defining at least one outlet port communicating with said third chamber.

7. A system for automatically controlling a brake applicable to a wheel of a vehicle comprising
vehicle speed monitoring means including
a rotatable flywheel responsively connected to an unpowered wheel of said vehicle when a vehicle brake, manually applicable to a wheel of said vehicle, is inoperative,
means for disconnecting said flywheel from said unpowered wheel for permitting said flywheel to rotate inde-

pendent of said unpowered wheel when said brake is operative,

inertial means for frictionally decelerating said flywheel as a function of the rate of deceleration of said vehicle, and

fluid valve sensing means responsively associated with said flywheel for generating a first fluid signal which is at least partially dependent upon the rotational speed of said flywheel,

wheel speed sensing means responsively connected to said brake applicable wheel for generating a second fluid signal which is at least partially dependent upon the rotational speed of said brake applicable wheel, and

comparing means responsively connected to said monitoring and wheel speed sensing means for generating a response which is substantially proportional to a difference between said first and second signals, said comparing means being operatively associated with with said brake to limit said difference.

4,088,376

WHEEL ANTI-SKID BRAKE CONTROL SYSTEM FOR A ROAD VEHICLE

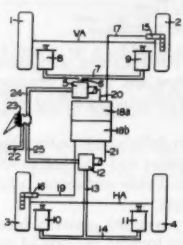
Klaus Lindemann, Hanover; Erich Reinecke, Beinhorn, and Lutz Weise, Misburg, all of Germany, assignors to WABCO Westinghouse G.m.b.H., Hanover, Germany

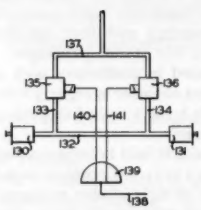
Filed May 25, 1976, Ser. No. 689,943

Claims priority, application Germany, Jun. 3, 1975, 2524427

Int. Cl.[2] B60T *8/10*

U.S. Cl. 303—96 **2 Claims**





1. A wheel anti-skid brake control system for a road vehicle having at least two axles with wheels at opposite sides thereof, each wheel being provided with a fluid pressure operative brake cylinder device to which a source of fluid pressure is connected via an operator's control valve device, said system comprising:

(a) sensor means for providing output signals in accordance with different dynamic wheel behavior conditions of one wheel of each of said at least two axles of said vehicle, said one wheel of one axle being diagonally opposed to said one wheel of the other axle;

(b) modulating valve means associated with each said brake cylinder device for influencing the fluid pressure connected thereto via said operator's control valve device;

(c) evaluation means for each axle subject to said output signals representing the behavior conditions of said one wheel of a respective one of said axles for effecting operation of each said modulating valve means associated with said respective one of said axles; and

(d) means for connecting the fluid pressure at one of said brake cylinder devices of a respective one of said axles with the other brake cylinder device thereof.

4,088,377

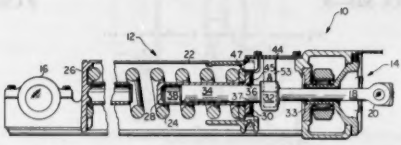
RECOIL SPRING LOCK DEVICE

Ara L. Corrigan, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 6, 1976, Ser. No. 655,940

Int. Cl.[2] B62D *55/30*

U.S. Cl. 305—10 **5 Claims**



1. In combination with a track-tensioning device, the track-tensioning device comprising first and second portions generally reciprocable so as to be movable in one and the other directions relative to each other, said first portion including a housing open at one end and closed at the opposite end, a helical spring disposed therein and engaging the closed end of said housing, a retainer ring and an open-ended cylinder axially aligned with the helical spring and defining a flange at its open end for engagement with the retainer ring distal of said helical spring; lock means for retaining the helical spring in the open-ended housing in at least a partially compressed state, said lock means comprising two elongated retaining pin members removably disposed in said housing with said retaining ring disposed between said helical spring and said retaining pins, said retaining pins spatially separated to allow the second portion to pass therebetween and compress said helical spring.

4,088,378

SEAT SLIDE INCLUDING RESILIENTLY DEFORMABLE ELEMENT

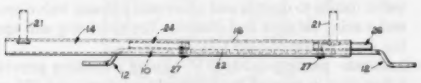
Joseph Pallant, Albrighton, near Wolverhampton, and John Paul Johndrow, Stafford, both of England, assignors to H. R. Turner (Willenhall) Ltd., Walsall, England

Filed Jan. 6, 1977, Ser. No. 757,236

Claims priority, application United Kingdom, Jan. 14, 1976, 1295/76

Int. Cl.[2] F16C *29/02*

U.S. Cl. 308—3 R **9 Claims**



1. A seat slide for supporting a vehicle seat above the floor of a vehicle, comprising a first member in the form of a guide channel having a base, side walls with in-turned flanges and an opening between said in-turned flanges, a second elongate member mounted in the guide channel for lengthwise sliding therein, said second member having first and second surfaces which respectively confront the base and the in-turned flanges of the first member, and at least one resiliently deformable element located in said first member between the base thereof and said first surface of the second member, each such element being resiliently deformable from a first configuration in which it resiliently urges the second member away from the base of the first member to cause said second surface of the second member to abut the in-turned flanges of the first member, and

a second configuration in which it allows the second member to move towards the base of the first member to an extent sufficient to create a clearance between said in-turned flanges and the second surface of said second member, said at least one element being caused to assume said second configuration in response to loads applied to the slide in a direction perpendicular to said base and serving to transmit such loads between the first and second members.

4,088,379

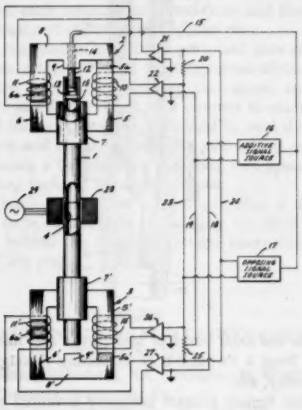
VARIABLE PERMANENT MAGNET SUSPENSION SYSTEM

Lloyd J. Perper, 3725 Ironwood Dr., Tucson, Ariz. 85705

Continuation-in-part of Ser. No. 507,108, Sep. 18, 1974, abandoned. This application Jul. 28, 1976, Ser. No. 709,559

Int. Cl.[2] F16C *39/00*

U.S. Cl. 308—10 **23 Claims**



1. Magnetic suspension apparatus comprising:

(a) a movable object having a longitudinal axis,

(b) at least one magnetic force applying means associated with said object, said means comprising a closed loop of magnetically permeable material including as a part thereof a substantially cylindrical portion encircling said object and having a pole piece positioned to form a gap between said pole piece and said object and arranged to exert force on said object generally along the longitudinal axis thereof, the magnitude of said force depending on the magnitude of the magnetic flux across said gap,

(c) first and second sections of permanently magnetizable material included in said magnetic loop in separate arms thereof,

(d) first and second magnetizing windings respectively encircling said separate arms of said magnetic loop,

(e) means associated with said object for developing servo signals in response to at least the rate of change of displacement of said object along its longitudinal axis,

(f) means for applying said servo signals to said first and second windings to produce fluxes in said magnetic loop such as to produce additive fluxes across said gap for restoring said object to a reference position along its longitudinal axis,

(g) means for producing an integrated signal varying according to the time integral of said servo signals,

(h) and means for applying to said first and second windings high-intensity current pulses controlled in accordance with said integrated signal to alter the permanent magnetization of one of said sections of permanently magnetizable material.

4,088,380

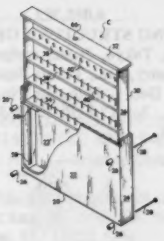
THREAD AND BOBBIN STORAGE CASE FOR EXISTING SEWING MACHINE CABINETS

Edith B. Watts, Rte. 5, Box 733, Thomasville, N.C. 27360

Filed Jan. 27, 1977, Ser. No. 762,839

Int. Cl.[2] A47B *57/06*

U.S. Cl. 312—237 **5 Claims**



1. In combination with a sewing machine cabinet of the type having an upper surface from which a sewing machine head extends and is selectively retractable, a sewing accessory storage case comprising:

(a) a housing including spaced side walls, and at least a rear wall, and attachment means associated therewith for releasably securing said housing against an existing exterior wall or a sewing machine cabinet with said rear wall being spaced from said existing wall;

(b) a drawer having at least a top wall and a pair of side walls slidably received within said housing for vertical movement;

(c) said drawer further including at least one partition member extending horizontally between said drawer side walls and including a plurality of upwardly extending spindles mounted thereon;

(d) resiliently biased, frictional connecting means extending between said drawer and said housing for holding said drawer in a multiplicity of raised, open positions whereby sewing accessories may be removed therefrom.

4,088,381

INTERCONNECTOR

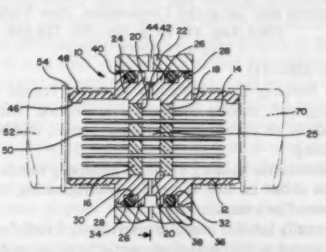
Herbert Martin Harnett, Whitstable, England, assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Nov. 8, 1976, Ser. No. 739,912

Claims priority, application United Kingdom, Nov. 19, 1975, 47667/75

Int. Cl.[2] H01R *3/04*; H02B *1/02*

U.S. Cl. 339—94 A **7 Claims**



1. An interconnector for installation in an opening in a wall to provide at least one electrical connection through said wall, said interconnector comprising:

a one-piece undivided tubular metal shell;

at least one conductor within said shell and extending parallel to the longitudinal axis of said shell; and

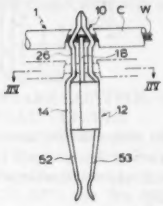
two glass sealing members spaced apart along said axis and pre-sealed against the inner surface of said shell and around said at least one conductor, the entire space enclosed by said two glass sealing members and the inner surface of said shell consisting of an empty pressure chamber through which only said at least one conductor passes, said glass sealing members supporting said conductor.

4,088,382

CONNECTING STRUCTURE OF TERMINALS

Yoshiaki Ichimura, Tokyo, Japan, assignor to Japan Aviation Electronics Industry, Ltd., Tokyo, Japan

Filed Dec. 1, 1976, Ser. No. 746,337
Int. Cl.² H01R *13/38*
U.S. Cl. 339—99 R **11 Claims**



1. A connecting structure of an electric terminal for connecting a coated wire, which structure comprising:

a base,

a pair of opposed forked members continuously extending from one end of said base and respectively having longitudinal channels at the center thereof, said pair of forked members further each having first portions for slitting only the coating of the coated wire at one place as it is inserted into the channels of said pair of forked members, second portions for exposing the core wire of said coated wire by splitting the coating along the single slit, said second portions of each of said pair of forked members touching at the ends thereof and forming a generally wedge shape therein between, and third portions for holding the exposed core wire of the coated wire, and

a center contact blade extending between said pair of forked members, said center contact blade cooperating with third portions of said forked members to hold said exposed core wire and making electrical contact with said exposed core wire.

4,088,383

FAULT-CLOSABLE ELECTRICAL CONNECTOR

Allen Herbert Fischer, Creve Coeur, and James Edgar Strauss, Maryland Heights, both of Mo., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,556
Int. Cl.² H01R *13/52*
U.S. Cl. 339—111 **24 Claims**

1. A bushing plug having a movable female contact for receiving and making engaging connection with the male electrode of an associated elbow connector, said bushing plug comprising:

an elastomeric housing having a generally tubular configuration about an axis thereof and terminating at either end thereof in a mouth;

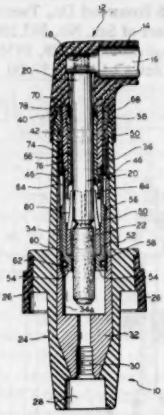
a generally tubular metallic insert body fixedly and coaxially mounted within said elastomeric housing, said insert body having a means at one end thereof for receiving an external terminal which projects into the adjacent end of said housing, and said body having a generally cylindrical chamber therein which forms a substantially enclosed chamber which opens into said mouth at the other end of said housing;

a generally cylindrical piston assembly slidably and coaxially mounted within said cylinder of said body and including:

a tubular metallic piston member having an annular piston head portion at one end thereof which portion faces said one end of said insert body,

a tubular insulating member fastened to the other end of said piston member coaxially therewith and extending therefrom toward said other end of said housing and completing the external dimensions of said piston assembly,

wherein the maximum external diameter of said piston assembly is no greater than the inside diameter of the opening of said insert body adjacent said mouth at said other end of said housing,



wherein the axial bores of said piston and insulating members form a through-bore extending through said piston assembly, and

a tubular female contact coaxially mounted to said piston member for movement therewith;

a tubular insert tip member coaxially mounted in said mouth at said other end of said housing and adjacent, to the other end of said insert body to complete said bushing plug; and,

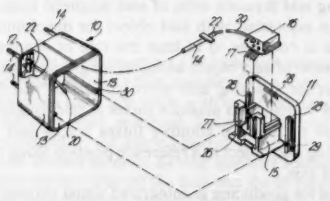
means including said tubular insert tip member for limiting the maximum translation of said piston assembly in the direction toward said other end of said body.

4,088,384

ADAPTOR FOR PLUG-IN TELEPHONES

Beverley William Gumb, London, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 29, 1976, Ser. No. 745,595
Int. Cl.² H01R *31/06*
U.S. Cl. 339—156 R **2 Claims**



1. An adaptor for connecting a multi-pin telephone outlet to accept a miniature plug, comprising:

a housing having a base and sides extending from said base to form a hollow enclosure, and a plurality of pins attached to and extending from said base in a predetermined pattern

to fit into terminals of a conventional multipin telephone outlet;

a cover on said housing and formations on the inner side of said cover, said formations in engagement with said sides to align and orientate said cover on said housing;

a miniature jack on the inside surface of said cover, said jack comprising a lower part integral with said cover and having rear and side walls, and an upper part attached to said lower part, said upper part and said rear and side walls defining a plug receiving cavity;

said upper part having a plurality of holes extending therethrough from a forward face to a rearward face, and a plurality of grooves in said forward face, a groove aligned with each hole, said grooves extending from said holes to said cavity;

a spring wire contact in each related hole and groove, each contact including a first part positioned in the hole, an intermediate part extending substantially normal to said first part and positioned in said groove, and a further part extending rearwards from said groove and extending into said cavity, each contact connected from said first part to an individual and different one of said pins;

slots in said rear wall of said lower part, said slots extending down from a top surface a predetermined distance, said top surface a joint face between said upper and lower parts, and said further part of a contact in each of said slots, said further parts pre-positioned by said slots;

an aperture in said cover aligned with said cavity, said aperture including a base surface including two spaced apart steps having inclined forward surfaces;

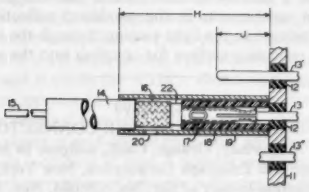
whereby a latch member on a miniature plug is deflected over said steps, on insertion of said plug, the latch member engaging behind the steps to prevent inadvertent withdrawal of the plug.

4,088,385

SHIELDED CONNECTORS FOR CLOSELY SPACED TERMINALS

Russell M. Adkins, Batesburg, S.C., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Dec. 23, 1976, Ser. No. 753,638
Int. Cl.[2] H01R *15/06*
U.S. Cl. 339—143 R **1 Claim**



1. A method of completing a shielded circuit connection from a coaxial cable lead to any one of a plurality of terminals on a device terminal board with an associated grounding plate, including the steps of:

(a) removing all insulation from a selected length of the center conductor at one end of said coaxial cable,

(b) removing the outer jacket covering the adjacent portion of the coaxial cable sheath and folding the exposed sheath back on itself,

(c) crimping a fitted contactor to the exposed center conductor,

(d) fitting an insulation tube over said contactor when secured to said central conductor,

(e) welding or soldering to said grounding plate, so as to enclose said one terminal, a conductive ferrule having a diameter to fit over said insulation tube when in place over said contactor and having a length to also cover said exposed sheath and fit onto the cable jacket beyond,

(f) completing a circuit connection by inserting the covered contactor and insulation tube inside said ferrule to couple said contactor to said one terminal, and

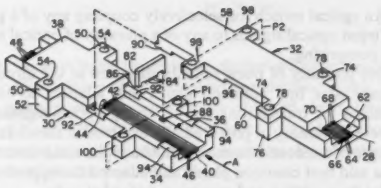
(g) soldering said ferrule to said exposed cable sheath to complete the circuit connection shield between said grounding plate and cable sheath and to hold said contactor and insulation tube in place.

4,088,386

OPTICAL WAVEGUIDE CONNECTOR USING RESILIENT MATERIAL AND V-GROOVE

Robert M. Hawk, Bath, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation of Ser. No. 498,329, Aug. 19, 1974, abandoned.
This application Aug. 30, 1976, Ser. No. 718,431
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.21 **19 Claims**



1. An optical fiber connector comprising

a first member of resilient material having a plurality of elongated V-shaped grooves in a surface thereof, each of said grooves being adapted to receive a pair of fibers, one from each of a pair of fiber cables that are to be connected, the two walls forming each of said V-shaped grooves being substantially symmetrical about a plane, the axes of said pair of fibers being disposed in the plane of the groove in which they are disposed, that portion of said grooves at which said walls intersect remaining free from contact with said fibers,

a second member of resilient material having a plurality of elongated elevated portions aligned with said grooves and forming therewith a plurality of apertures which are adapted to receive said fibers, said second member being adapted to contact that surface of said fibers opposite said grooves, the two walls of said grooves and said second member contacting each of said fibers at three noncontiguous surface areas, said first and second members each having first and second sections which are secured together in abutting relationship, a given length of the first section of said first member extending beyond the first section of said second member, the second section of said second member extending beyond the second section of said first member a distance equal to said given length, and means for securing together said first section of said first member and said second section of said second member so that the given length of said first section of said first member becomes aligned with the corresponding extending portion of said second member, said optical fibers being adapted to be connected along the overlapping portions of said first and second members, and

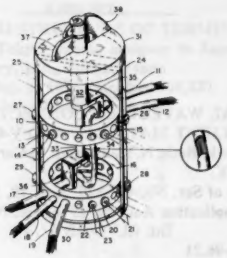
means or applying a force to said first and second members in a direction perpendicular to said axes and in said plane, said force tending to bring said members together and causing said members to deform against the adjacent surfaces of said fibers, thereby simultaneously aligning and mechanically securing said fibers.

4,088,387

OPTICAL SWITCH

Adolph L. Lewis, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 22, 1977, Ser. No. 770,863
Int. Cl.[2] G02B 5/16
U.S. Cl. 350—96.15 12 Claims



1. An optical switch for selectively coupling any of a plurality of input optical signals to any of a plurality of optical output paths comprising:

a first plurality of ports radially disposed at the circumference of a first common plane, and adapted to support means for transmitting and receiving optical signals;

a second plurality of ports radially disposed at the circumference of a second common plane have the same central axis as said first common plane, and adapted to support means for transmitting and receiving optical signals;

a rotatable assembly mounted on a common support structure with said input ports and said output ports,

said rotatable assembly having first and second members independently movable about said central axis; and

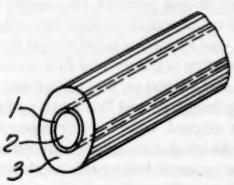
a length of flexible fiber optic bundle having one end supported by a radial arm of said first member for alignment with a selected one of said first plurality of ports, and its other end supported by a radial arm of said second member for alignment with a selected one of said second plurality of ports.

4,088,388

O-TYPE OPTICAL WAVEGUIDE

Tsuneo Nakahara; Masao Hoshikawa, both of Yokohama; Satoshi Shiraishi, Osaka; Shiro Kurosaki, Osaka, and Kunio Fujiwara, Osaka, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 406,112, Oct. 12, 1973. This application Jul. 26, 1976, Ser. No. 708,640
Claims priority, application Japan, Oct. 13, 1972, 47-102839; Oct. 13, 1972, 47-102840
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.30 2 Claims



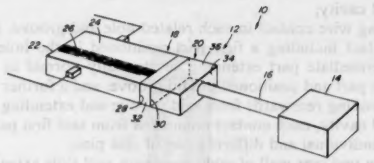
1. An optical waveguide comprising a rod of fused silica having formed thereon a layer of doped fused silica having an index of refraction which is greater than that of said rod, and an outside layer of fused silica over said layer of doped fused silica the surfaces between said layers being extremely smooth and clean.

4,088,389

LARGE BANDWIDTH OPTICAL COMMUNICATION SYSTEMS UTILIZING AN INCOHERENT OPTICAL SOURCE

Joseph Zucker, Waban, and Robert Lauer, Stow, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Apr. 1, 1976, Ser. No. 672,577
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.15 16 Claims



1. In an optical communications system, an optical link comprising:

an optical fiber waveguide;

a source of spontaneously emitted wideband light having a light-exiting face; and

a layer of dielectric material having a pair of spaced-apart, partially reflecting surfaces, one partially reflecting surface being adapted for intimate coupling to the light-exiting face of the source for receiving wideband spontaneously emitted light therefrom and dividing the light into a first reflected beam and a first unreflected beam, the second partially reflecting surface being adapted for intimate coupling to the waveguide and spaced apart from the first surface to reflect a portion of the first unreflected beam in a phase-shifted relation with the first reflected beam,

the spacing between the surfaces being selected to create a 180° phase difference between wavelength components of the two reflected light beams at a selected wavelength,

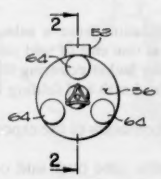
whereby the two reflected beams destructively interfere within a narrow spectral width and the consequently absent components in the combined reflection thereby predominate in the light passing through the second partially reflecting surface for coupling into the waveguide.

4,088,390

SINGLE OPTICAL FIBER CONNECTOR

Ronald L. McCartney, Orange, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 629,004, Nov. 5, 1975, abandoned. This application May 3, 1976, Ser. No. 682,274
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.21 35 Claims



1. A single optical fiber termination pin comprising:

a hollow ferrule having a bore therethrough for receiving an optical fiber;

an eyelet on the forward end of said ferrule coaxial with said bore, said eyelet being formed of a readily deformable

material so that the wall thereof is capable of being deformed inwardly toward said fiber;

said ferrule having three forwardly extending posts thereon generally equally spaced circumferentially about said eyelet; and

said posts and eyelet terminating in forward ends generally lying in a common plane perpendicular to the axis of said ferrule.

4,088,391

IRREGULAR FERROELECTRIC ELEMENT DEVISED FOR SINGLE DOMAIN-WALL MOTION

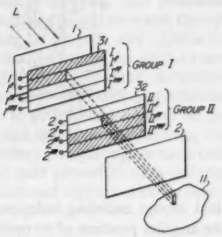
Akio Kumada, Kodaira; Hiroshi Takano; Yoshizumi Eto, both of Hachioji, and Masao Hibi, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 16,199, Mar. 3, 1970, Pat. No. 3,936,146. This application Oct. 29, 1975, Ser. No. 626,996

Claims priority, application Japan, Mar. 15, 1969, 44-19912

Int. Cl.[2] G02F *1/05, 1/29*

U.S. Cl. 350—150 3 Claims



1. A slit light beam scanner unit comprising a plurality of irregular ferroelectric elements, each of which irregular ferroelectric elements comprises a crystal plate of gadolinium molybdate, which is a Z-plate having a pair of surfaces opposite to each other and is cut in the <110> direction along at least a pair of sides opposite to each other, and means for effecting polarization reversal provided at the central portions of the opposite Z-planes of said crystal plate, said gadolinium molybdate elements including at least a domain configuration such that two nucleus regions of opposite polarities are disposed on opposite sides of the region where said means for effecting polarization reversal are provided and in which said means for effecting polarization reversal are optically transparent electrical means capable of applying to said gadolinium molybdate crystal an electric field which is at least equal in magnitude to the coercive field of said gadolinium molybdate and being arranged in such a manner that the extending directions of the nucleus regions provided on the opposite sides of the gadolinium molybdate crystal plate are parallel with each other and each crystal plate is disposed in parallel on a plane, each irregular ferroelectric element having a thickness between the Z-planes thereof so that it acts as a quarter-waveplate and said nucleus regions of opposite polarities being disposed on opposite sides of a domain growing region, said iregular ferroelectric elements being arranged so that, after the domain of one polarity has grown to extend to the nucleus region of an opposite polarity in one of said elements, the growth region of the domain of one polarity toward the nucleus region of an opposite polarity in another opposite element is initiated, and so on.

4,088,392

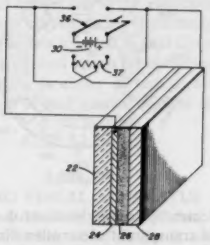
ELECTROCHROMIC VARIABLE OPTICAL TRANSMISSION DEVICE WITH A LIQUID ELECTROLYTE

Marion Douglas Meyers, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 609,251, Apr. 13, 1975, abandoned, which is a continuation of Ser. No. 41,154, May 25, 1970, abandoned. This application Apr. 13, 1976, Ser. No. 676,601

Int. Cl.[2] G02F *1/36*

U.S. Cl. 350—357 7 Claims



1. A variable light transmission device which comprises in combination a layer of a solid persistent electrochromic material in contact with a separate layer of liquid electrolyte, said layer of liquid electrolyte and said layer of solid electrochromic material being disposed between and each contacting one of a pair of conductive electrodes.

4,088,393

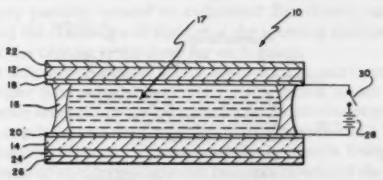
FIELD EFFECT MODE LIQUID CRYSTAL DISPLAY MATERIALS

Masao Hirano, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Dec. 31, 1975, Ser. No. 645,623

Int. Cl.[2] G02F *1/13;* C09K *3/34*

U.S. Cl. 350—350 7 Claims

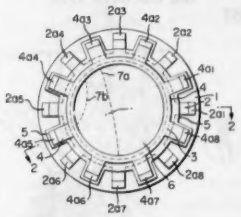


1. In an electro-optical display device of the field mode including first and second electrodes comprising conductivity surfaces on opposed plates, a layer of liquid crystal medium having twisted nematic properties at room temperature disposed between said electrodes, and means for establishing an electrical potential between said electrodes, the improvement comprising a dopant comprising ascorbic acid in solution in the liquid crystal medium to increase the life of the electrodes.

4,088,394
ELECTRO-OPTICAL LIGHT CONTROL ELEMENT

Jun Shimomura, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed May 21, 1976, Ser. No. 688,740
Claims priority, application Japan, May 29, 1975, 50-63438
Int. Cl.[2] G02F *1/28*
U.S. Cl. 350—356 7 Claims



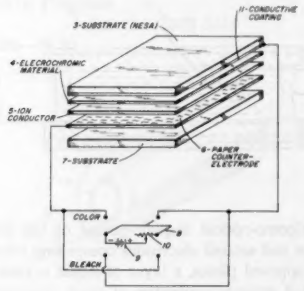
1. In an electro-optical light control element including at least a pair of transparent electrodes disposed in a predetermined spaced apart relationship, a layer of electro-optical substance disposed between said transparent electrodes and having the light transmission factor thereof variable in accordance with a voltage applied thereto, and substrate means supporting thereon said transparent electrodes and said layer of electro-optical substance, said transparent electrodes and said layer of electro-optical substance together forming a control area for controlling the quantity of light passing through said transparent electrodes and said layer of electro-optical substance, the improvement comprising:

separate conductor electrodes positioned around said control area at a plurality of locations on one of said transparent electrodes and at at least one location on the other of said transparent electrodes so that the distribution of the light transmission factor within said control area may be made to substantially conform to a predetermined distribution characteristic by applying a voltage between a conductor electrode at at least one location on one transparent electrode and a conductor electrode at at least one location on the other transparent electrode.

4,088,395
PAPER COUNTER-ELECTRODE FOR ELECTROCHROMIC DEVICES

Robert Domenico Giglia, Rye, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 27, 1976, Ser. No. 690,446
Int. Cl.[2] G02F *1/36*
U.S. Cl. 350—357 16 Claims

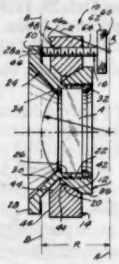


1. In a variable light modulating device of the electrochromic type having an arrangement comprising a light transmitting substrate having a persistent electrochromic material as a light modulating material and a counter-electrode separated from said electrochromic material by an ion-conducting material, an improved counter-electrode structure consisting essentially of a paper sheet including a web of filaments permeated with carbon.

4,088,396
OPTICAL MOUNT WITH INDEPENDENTLY ORTHOGONALLY ADJUSTABLE ELEMENT

Arthur Edelstein, College Point, N.Y., assignor to Ardel Kinamatic, College Point, N.Y.

Filed Sep. 2, 1976, Ser. No. 719,834
Int. Cl.[2] G02B *7/02*; F16H *53/02*
U.S. Cl. 350—252 24 Claims



1. An optical mount enabling independent orthogonal adjustment of the angular position of an optical element comprising

A. a cell adapted to receive an optical element and comprising a circumferentially extending partial spherical section and a pair of portions extending outwardly of said cell spherical section;

B. a base defining a chamber open on one side thereof for receipt of at least a part of said cell therein and comprising a conical seat on said open side receiving and conforming to at least a portion of said cell spherical section and a pair of portions extending outwardly of said seat and facing said cell portions;

C. a pair of independently adjustable means spaced from each other by substantially 90°, secured to one of said portion pairs for movement therewith, and having parts adapted to operatively abut against aligned sections of the other of said portion pairs, each of said adjustable means parts having an operative abutment surface which is essentially a partial spherical surface of longitudinal radius R, where R is the spacing between two planes parallel to the plane of the optical element, the first of said two planes passing through the points of operative abutment between said adjustable means parts and said aligned sections and the second of said two planes passing through the geometric center of said cell spherical section; and

D. means for biasing towards each other said parts of said adjustable means and said corresponding aligned sections of said other portion pair;

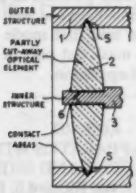
whereby said cell is pivotable orthogonally about axes passing through the geometric center thereof, without cross-coupling, by independent adjustment of said adjustable means.

4,088,397

OPTICAL DEVICE COMPRISING MECHANICAL CONNECTIONS TRANSVERSE TO THE OPTICAL PATH

Francis Jourdan; Jean-Paul Lepeytre; Andre' Masson, and Charles Le Roux, all of Paris, France, assignors to Thomson-CSF and Etablissements Pierre Angenieux, both of Paris, France

Filed Sep. 21, 1976, Ser. No. 725,156
Claims priority, application France, Sep. 24, 1975, 75 29265
Int. Cl.[2] G02B 7/02
U.S. Cl. 350—253 5 Claims



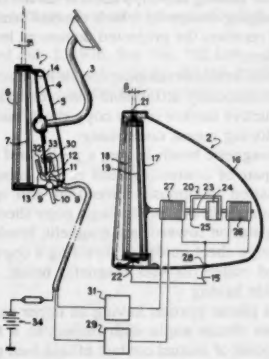
1. An optical device comprising: at least one optical element having a cut-away area along the optical axis, an outer mechanical structure for supporting peripherally the said optical element, an inner mechanical structure accommodated in said cut-away area and secured to the outer structure by mechanical connections, said connections being formed by said optical element and mechanical gripping and positioning members arranged in the respective contact between the optical element and the said structure to provide any obstruction along the optical path, comprised between the said structure, the said mechanical gripping and positioning members comprising deformable elastic members for holding substantially an unvaried centered position to said optical element for predetermined severe temperature and mechanical operating conditions, the said deformable members comprising, in each contact zone, at least one mechanical part provided with deformable arcuate segments against which sad optical element bears.

4,088,398

DEVICE FOR THE SIMULTANEOUS CONTROL OF THE DRIVING-MIRRORS OF AN AUTOMOBILE VEHICLE

Pierre Edouard Zoursel, Malakoff, France, assignor to Automobiles Peugeot, Paris, France

Filed Oct. 29, 1976, Ser. No. 737,020
Claims priority, application France, Dec. 3, 1975, 75 36961
Int. Cl.[2] B60R 1/04, 1/06; G02B 17/00
U.S. Cl. 350—280 5 Claims



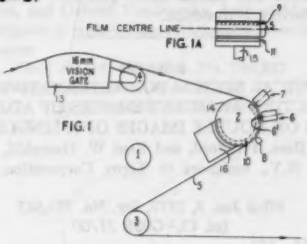
1. A device comprising at least one outside driving-mirror and an inside driving-mirror of an automobile vehicle, said inside driving-mirror comprising means defining two surfaces having different reflecting powers, at least the surface having the maximum reflecting power being capable of being put into two distinct angular positions, a manual control means for shifting the surface having maximum reflecting power between said two angular positions, said outside driving-mirror comprising means defining two surfaces having different reflecting powers, at least the surface having the maximum reflecting power of the outside driving-mirror being capable of being put into two distinct angular positions, electromagnetic shifting means connected to the surface having maximum reflecting power of the outside driving-mirror for shifting it between said two angular positions thereof, a circuit for connection to a source of current and connected to the electromagnetic shifting means for supplying current to the electromagnetic shifting means and switching means inserted in said circuit and associated with said manual control means for actuating said electromagnetic shifting means in either of two directions simultaneously with actuation of said manual control means in either of two directions.

4,088,399

AUDIO VISUAL APPARATUS

John David Millward, Hitchin; Brian Wilsher, Royston, and Ronald Mumford, Hitchin, all of England, assignors to The Rank Organisation Limited, London, England

Filed May 13, 1976, Ser. No. 686,549
Claims priority, application United Kingdom, May 13, 1975, 20137/75; Aug. 21, 1975, 34760/75
Int. Cl.[2] G03B 31/02
U.S. Cl. 352—27 5 Claims



1. In a telecine apparatus:

a common rotatable drive capstan for films of either one of two film gauges, the capstan having a cylindrical film-driving surface concentric with the axis of rotation of the capstan;

a common scanning position for films of either gauge;

means providing a different film path for each film gauge whereby the distance along each film path from the scanning position to the capstan is equal to the picture/optical sound spacing of the respective film gauge, each film path being such that in use the capstan is engaged by the film only partially around its cylindrical film-driving surface and the centre-line of the film at the scanning position and at the capstan is the same for each gauge;

first and second optical sound heads for the narrower and wider film gauges respectively, each optical sound head being arranged in close proximity to the drive capstan and comprising two parts including a light source and a light-sensitive detector respectively, the two parts being disposed so as to be in alignment on opposite sides of the edge of a film of the respective gauge when the film is driven by the capstan;

at least one annular groove in the cylindrical film-driving surface of the capstan, the groove lying in a plane perpendicular to the rotational axis of the capstan;

a fixed support member disposed adjacent a region of the capstan which in use is not engaged by a film of either gauge; and

a fixed curved arm supported by the support member and extending within the groove to a region of the capstan which in use is engaged by at least by a film of the nar-

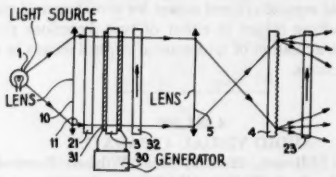
rower gauge, the first optical sound head having one part supported in the groove by the curved arm.

4,088,400

DISPLAY DEVICES

Georges Assouline; Michel Hareng; Michel Roncillat, and Eugéne Leiba, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Dec. 21, 1973, Ser. No. 427,304
Claims priority, application France, Dec. 29, 1972, 72.46907
Int. Cl.[2] G03B *21/14;* G02B *5/30;* G02F *1/01*
U.S. Cl. 353—20 **6 Claims**



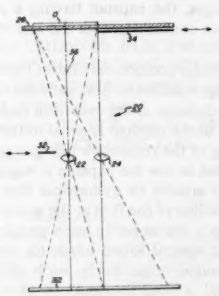
1. A display device comprising means for producing a parallel beam of linearly polarized light, and successively positioned for receiving said light; electro-optical modulating means, first linear polarizer means having a first polarization direction, diffuser means and second linear polarizer means having a second polarization direction.

4,088,401

OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE IMAGES OF A SINGLE OBJECT

James D. Rees, Pittsford, and Kent W. Hemphill, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 3, 1977, Ser. No. 756,582
Int. Cl.[2] G03B *21/00*
U.S. Cl. 353—122 **6 Claims**



1. An optical system for alternatively projecting an image of a full object field in a first mode of operation and projecting a plurality of images of a partial object field in a second mode of operation, including:

an object station defining an object field

an image station defining an image field

a first projection lens disposed on a first optical axis between said object and image stations;

said object and image fields being respectively in object and image conjugate relationship to said first projection lens,

a second projection lens disposed on a second optical axis between said object and image stations,

a part of said object field and a first part of said image field being respectively in object and image conjugate relationship to said first projection lens,

the same said part of said object field and a second part of said image field being respectively in object and image conjugate relationship to said second projection lens,

a shutter operatively disposed relative to said second projection lens to close optical communication through said second projection lens in said first mode of operation and to open optical communication through said second projection lens in said second mode of operation, and

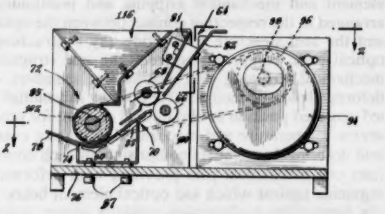
a stop operatively disposed relative to said object station and movable between a clear position to permit unobstructed optical communication between said object station and said image station in said first mode of operation and a masking position to mask out part of said object field in said second mode of operation.

4,088,402

PHOTOCOPYING APPARATUS WITH MAGNETIC BRUSH DEVELOPER AND SHEET GUIDE

Robert W. Rudd, Westport, and Richard S. Holodnak, Stratford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Feb. 12, 1976, Ser. No. 657,409
Int. Cl.[2] G03G *15/09*
U.S. Cl. 355—3 DD **3 Claims**



1. An apparatus for photocopying image indicia from a document onto a copy sheet having a photoconductive surface including:

an illuminating station for receiving the document and for illuminating the document image indicia;

a lens for projecting the document image indicia onto the photoconductive surface of the copy sheet;

a corona charger for placing a uniform electrostatic charge on the photoconductive surface of the copy sheet;

means for feeding the copy sheet from the corona charger to an imaging station at which the uniformly charged copy sheet receives the projected document image indicia from said lens;

a magnetic brush developing means for placing magnetically electrostatically attractable toner material on the photoconductive surface of the copy sheet, said magnetic brush developing means comprising:

1. a magnetic brush having a peripheral surface,

2. a pair of contacting feed rollers mounted for mutual rotation in opposite directions and spaced from said magnetic brush for feeding a copy sheet from said imaging station toward said magnetic brush,

3. a copy sheet guide for directing a copy sheet from said feed rollers to said magnetic brush, said copy sheet guide having

a. a planar portion having an upper surface disposed at an obtuse angle with respect to a tangent from the point of mutual contact of said feed rollers for receiving the leading edge and successive portions of the copy sheet, and

b. a curved portion merging with said planar portion and extending beneath said magnetic brush in concentric spaced relationship therewith,

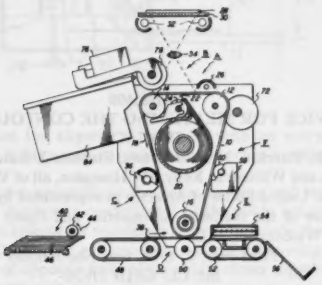
whereby the leading edge and successive portions of the copy sheet are directed toward said upper surface at said obtuse angle to cause said copy sheet to continuously contact said guide plate and thereby closely conform to the contour of said guide plate as the copy sheet comes into contact with the particulate toner on said magnetic brush.

4,088,403

REPLENISHABLE PHOTOSENSITIVE SYSTEM

William Kingsley, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 27, 1976, Ser. No. 718,289
Int. Cl.² G03G *15/00*
U.S. Cl. 355—16 **11 Claims**



1. A reproducing machine of the type having at least one photoconductive member in a prescribed location, including:

means for storing a plurality of photoconductive members;

means, defining an endless path in the prescribed location for entraining the photoconductive member thereabout;

a rotating drive roller engaging the photoconductive member and advancing at least a portion of the photoconductive member from said storing means to a predetermined position; and

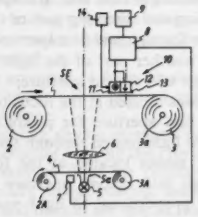
a tow bar positioned to receive the leading edge of the portion of the photoconductive member advanced to the predetermined position by said drive roller, said tow bar moving about the endless path defined by said entraining means to dispose the photoconductive member thereat.

4,088,404

APPARATUS FOR APPLYING MARKERS TO WEBS OF PHOTOGRAPHIC MATERIAL IN COPYING MACHINES

Wolfgang Zahn, Munich, and Erich Nagel, Anzig, both of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Jul. 2, 1976, Ser. No. 702,139
Claims priority, application Germany, Jul. 10, 1975, 2530744
Int. Cl.² G03B *29/00, 27/52*
U.S. Cl. 355—29 **19 Claims**



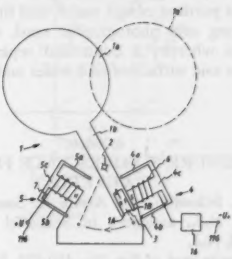
1. In a copying machine, particularly in a projection printer, wherein a web of photographic material is moved along a predetermined path past an exposure station to be provided with latent images of portions of a movable original, wherein said portions of the original form groups of successive portions belonging to different orders, and wherein the original is provided with indicia denoting the last portions of successive orders, apparatus for applying to the web first markers which denote successive images and the locations where the web is to be severed to yield discrete prints, and second markers denoting the images corresponding to last portions of successive orders, said apparatus comprising a mobile support; first and second marker applying units mounted on said support, said first unit having first and second devices for respectively applying first and second markers of a first type and said second unit having first and second devices for respectively applying first and second markers of a second type, said support being adjustable relative to said path in accordance with the desired format of images; means for rendering a selected unit operative for the application of first and second markers by the corresponding first and second devices; means for monitoring the original for the presence of indicia and for producing signals in response to detection of successive indicia; and a mechanical storage having means for storing said signals and means for transmitting the thus stored signals to said second device of the selected unit with a predetermined delay.

4,088,405

APPARATUS FOR MOVING COMPONENT PARTS IN PHOTOGRAPHIC COPYING MACHINES OR THE LIKE

Karel Pustka, and Gabriel Vondrovsky, both of Munich, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Jul. 16, 1976, Ser. No. 705,817
Claims priority, application Germany, Jul. 21, 1975, 2532563
Int. Cl.² G03B *27/76, 9/08*
U.S. Cl. 355—71 **28 Claims**



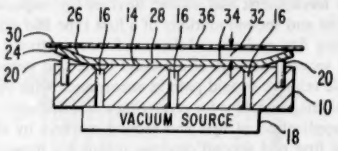
1. Apparatus for moving a shutter blade, a filter or an analogous component of a photographic copying machine or the like between spaced-apart first and second end positions by magnetic force, comprising guide means in or on which said component is freely movable between said end positions; a first magnetic system having means for attracting said component to either of said end positions and for holding said component in the selected end position; a second magnetic system including electromagnet means energizable to initiate the movement of said component from either one of said end positions toward the other end position and to thereby accelerate said component, said attracting and holding means of said first magnetic system being arranged to repel said component during movement of said component from said one end position beyond a neutral position disposed intermediate said end positions; and control means for deenergizing said electromagnet means while said component occupies said neutral position or is located between said neutral and other end positions whereupon said first system completes the movement of said component to and thereupon holds said component in the other end position.

4,088,406

METHOD OF PERFORMING CONTACTLESS PHOTOLITHOGRAPHY

Joel Ollendorf, West Orange, and Frank J. Cestone, Flemington, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 568,716, Apr. 16, 1975, Pat. No. 4,006,909.
This application Nov. 15, 1976, Ser. No. 742,069
Int. Cl.[2] G03B *27/02*
U.S. Cl. 355—132 2 Claims



1. A method of performing contactless photolithography utilizing a photographic mask overlying a surface of a flexible semiconductor wafer comprising the steps of:

positioning said semiconductor wafer above a substantially planar surface of a wafer vacuum chuck having means for mechanically maintaining a fixed distance between first portions of said wafer adjacent said means and said surface of said vacuum chuck, said means positioned between said wafer and said chuck and extending from said chuck so as to cause said first portion of said wafer to be spaced above second portions of said wafer when vacuum is applied,

applying a vacuum to said surface of said vacuum chuck sufficient in negative pressure to cause second portions of said wafer spaced from said means to be drawn towards said surface of said vacuum chuck, whereby said first portions are elevated above said second portions, and

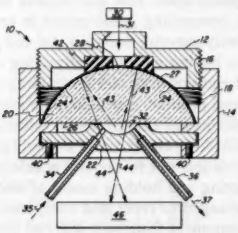
placing said photographic mask above and in contact with said first portions of said wafer, said first portions thereby supporting said photographic mask above said second portions whereby a controlled separation is provided between said surface of said wafer and said photographic mask.

4,088,407

HIGH PRESSURE FLUORESCENCE FLOW-THROUGH CUVETTE

Dietmar M. Schoeffel, and Armin K. Sonnenschein, both of Hillsdale, N.J., assignors to Schoeffel Instrument Corp., Westwood, N.J.

Continuation-in-part of Ser. No. 450,676, Mar. 13, 1974, Pat. No. 3,985,441. This application Jul. 9, 1976, Ser. No. 703,788
Int. Cl.[2] G01N *1/10, 21/52*
U.S. Cl. 356—85 13 Claims



1. A cuvette for liquid chromatographic analysis wherein light from a light source is directed to a sample of a liquid in the cuvette and a maximum amount of light scattered by the liquid is collected from said cuvette comprising:

an optically clear chamber adapted to contain therein the sample of the liquid and disposed to receive light from the light source;

entrance means and exit means connected to the chamber to permit the liquid to flow therethrough;

a solid block of light transparent material in the shape of a solid of revolution having a curved light directing surface generated by a curve having a configuration and placement relative to the chamber such that said maximum amount of light scattered by the liquid in the chamber is collected and directed in a specific direction; and

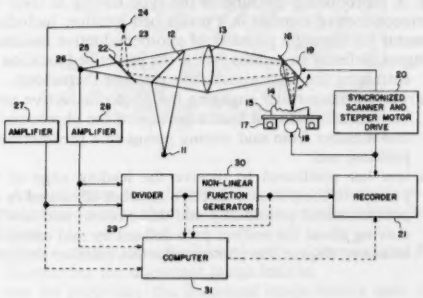
a reflective material on the light directing surface of the solid block for reflecting essentially all of the light at that surface to maximize the amount of optical energy directed in the specific direction.

4,088,408

DEVICE FOR MEASURING THE CONTOUR OF A SURFACE

Ernest E. Burcher, Newport News; Stephen J. Katzberg, Yorktown, and William L. Kelly, IV, Hampton, all of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 8, 1976, Ser. No. 740,155
Int. Cl.[2] G01B *11/30*
U.S. Cl. 356—120 8 Claims



1. Apparatus for measuring the contour of a surface comprising:

a source of light;

means for directing light from said light source onto said surface;

means for focusing the light directed onto said surface at a point not below the highest point on said surface;

means for scanning said surface with said focused light;

a first aperture;

a second aperture larger than said first aperture;

means for focusing and directing part of the light reflected by said surface through said first aperture and for focusing and directing another part of the light reflected by said surface through said second aperture;

first detector means located at the focus of the light passed through said first aperture for producing a first signal proportional to light passed through said first aperture;

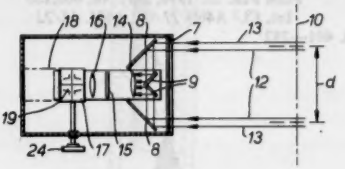
second detector means located at the focus of the light passed through said second aperture for producing a second signal proportional to light passed through said second aperture; and

means for obtaining the ratio of said first and second signals whereby said ratio is indicative of the contour of said surface.

4,088,409
OPTICAL ROLL ALIGNMENT DEVICE

Bernard J. Furness, Sheffield, England, assignor to British Steel Corporation, London, England

Filed Jul. 8, 1976, Ser. No. 703,703
Claims priority, application United Kingdom, Jul. 18, 1975, 30270/75
Int. Cl.² G01B *11/27*; B21C *51/00*
U.S. Cl. 356—153 **10 Claims**



1. A device for aligning a roll pass with an entry guide therefor in a rolling mill having an entry guide housing comprising

optical means insertable in the guide housing and including means for displaying co-ordinates of the guide housing,

a reflective system for providing an image of only the shoulders of the mating roll grooves, the image showing lateral spacing of opposite pairs of shoulders closer together than their actual spacing,

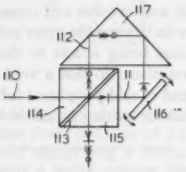
a lens system for magnifying the image and

a viewing system by which the magnified image is viewed together with the co-ordinates of the guide housing whereby any misalignment between said housing and the roll pass may be observed and corrected.

4,088,410
OPTICAL SIZING INSTRUMENT

Francis Hughes Smith, York, England, assignor to Vickers Limited, Millbank, England

Filed Feb. 17, 1976, Ser. No. 658,719
Int. Cl.² G01B *11/02*; G02B *27/14*
U.S. Cl. 356—163 **26 Claims**



1. An improved optical sizing instrument of the kind comprising:

(i) a binocular viewing head having a beam divider and two eyepieces for viewing respective intermediate real images, of a field of view under investigation, formed at a common focal plane thereof;

(ii) an objective arranged to form a primary real image, of the field of view, at a first position upstream of the said common focal plane;

(iii) an image-splitting device arranged between the objective and the binocular viewing head for splitting a primary light beam, received from the objective, into first and second secondary image-bearing beams which, downstream of the said device, are spaced from one another by a distance which is selectively variable by adjustment of the said device;

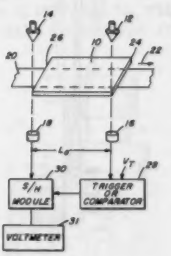
(iv) first optical imaging means mounted downstream of the objective, but upstream of the said device for forming a real image of the obective's exit pupil at a point optically equivalent to a point from which the said two secondary beams appear, immediately downstream of the said device, to be mutually divergent; and

(v) second optical imaging means mounted downstream of the said device and the said first position, but upstream of the said common focal plane, for bringing to a focus at the common focal plane the images of the field of view that are borne respectively by the said two secondary beams; wherein the improvement resides in that the image-splitting device comprises a beam splitting surface for splitting the incident said primary light beam into the said first and second secondary beams by transmission and reflection respectively at the said surface, and means defining an uneven plural number of reflection-surfaces arranged to reflect the said first and second secondary beams through respective first and second paths which return the secondary beams to the beam splitting surface whereby the said first and second secondary beams can emerge from the said device in substantially the same path, one of said reflection-surfaces being common to said first and second paths and being deflectable to deflect said first and second paths in opposite angular directions to separate said paths to adjust the said distance between the said two secondary beams.

4,088,411
LENGTH MEASUREMENT APPARATUS FOR CONTINUOUSLY ADVANCING ARTICLES

Gary W. Ahlquist, Webster, and Michael K. Milley, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,365
Int. Cl.² G01B *11/04*
U.S. Cl. 356—167 **1 Claim**



1. Apparatus for measuring the length of each of a series of continuously advancing articles, each article possessing an actual length L distributed about a nominal length L_o and each article having a leading edge in the direction of advancement and a trailing edge, said apparatus comprising:

first sensing means for sensing the position of one of said leading and trailing edges of the advancing article and for generating a first output signal indicative thereof;

second sensing means for sensing the position of the other of said leading and trailing edges of the advancing article and generating a second output signal indicative thereof;

trigger means coupled to said first sensing means for generating a trigger signal for triggering said second sensing means when said one of said leading and trailing edges of the advancing article reaches a predetermined position;

length indicator means, operable in response to said trigger signal, for sampling said second output signal when said second sensing means is triggered by said trigger signal, said sampled second output signal being indicative of the actual length L of the advancing article;

said first and second sensing means each comprise a radiation source and a radiation sensor positioned on opposite sides of the advancing article such that as the advancing

article passes between said radiation source and said radiation sensor the amount of radiation received by said radiation sensor, and thus the output signal, varies as a function of the sensing area of said radiation sensor which is progressively obstructed from said radiation source by said advancing article;

reference means for generating a reference signal;

comparing means for comparing the output signal of said radiation sensor to said reference signal and generating a control signal indicative thereof;

compensation means, responsive to said control signal, for applying a compensating signal to said radiation source to adjust the level of radiation from said radiation source causing said output signal of said radiation sensor to equal said reference signal; and

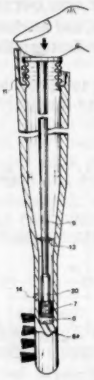
overriding means for overriding said control signal when the advancing article obstructs said radiation sensor and for holding the radiation output level of said radiation source to the level of radiation generated just prior to obstruction of said radiation sensor by the advancing article.

4,088,412

FOUNTAIN BRUSH

Luigi Del Bon, 141, Feldstrasse, Aarburg, Switzerland (CH-4663)

Filed Aug. 24, 1976, Ser. No. 717,359
Int. Cl.[2] A46B *11/02*
U.S. Cl. 401—151 **17 Claims**



1. A fountain brush having a bristle carrier and a set of bristles thereon, a handle attached to the bristle carrier and forming a reservoir for a liquid or pasty medium, and an actuating device, attached to the end of the bristle carrier, remote from the bristles and comprising an actuating press member, which is attachable to the inner wall of the handle via compressible bellows means, a channel leading through the bristle carrier from the reservoir to the bristles and having an outlet orifice between the bristles, and an obturating member which closes the said orifice or clears the latter for the discharge of the medium therefrom, wherein the obturating member is devised as a slide valve body guided in the interior of the channel and traveling sealingly along the channel wall, the compressible bellows means is devised as a return spring member and is sealingly connected to the actuating press-member only after the medium has been filled into the reservoir, and a connecting member, extending through the interior of the reservoir, is provided which rigidly connects the press-member and the slide valve body to one another and is of such length that when the bellows means are relaxed the slide valve body seals the outlet orifice, whilst it clears the said orifice when the bellows means are compressed, wherein a part of the wall of the handle, starting from the bristle-free end which carries the actuating device and up to at least the zone at which the handle adjoins the bellows means, is rigid and comprises a sleeve portion which is open at the end of the handle remote from the bristles and is provided around the bellows means.

4,088,413

ARTISTS BRUSHES

Raymond René Rossignol de la Ronde, Paris, and Charles Henri Castek, Pordic, both of France, assignors to La Brosse et Dupont, Paris, France

Filed Feb. 23, 1976, Ser. No. 660,135
Int. Cl.[2] A46B *11/04*; A47L *13/22*
U.S. Cl. 401—282 **3 Claims**

1. A liner brush comprising a handle with a ferrule having an open end, a peripheral tuft of hairs having an inner end peripherally arranged inside of said ferrule in a first plane substantially perpendicular to the longitudinal axis of the brush and tapered outer end extending outside of the open end of said ferrule, and a central tuft of hairs of substantially lesser cross-sectional area arranged along said longitudinal axis of the brush, said central tuft having an inner end arranged inside of said ferrule in a second plane substantially perpendicular to said longitudinal axis and an outer end extending outside of the open end of said ferrule beyond the outer end of said peripheral tuft, said second plane being nearer to the open end of said ferrule than said first plane, so that a void channel is formed inside of the inner end of said peripheral tuft and adjacent said central tuft inner end for storing liquid material.

4,088,414

COUPLING FOR JOINING SECTIONS OF PIPE AND METHOD FOR ITS USE

Daryl L. Fallein, 15716 E. Sprague, Veradale, Wash. 99037

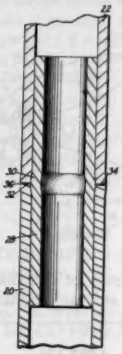
Filed Sep. 2, 1976, Ser. No. 719,963
Int. Cl.[2] F16B *13/00*
U.S. Cl. 403—282 **2 Claims**

2. A coupling for joining sections of scrap tubular pipe together end to end into a continuous length to form posts for chain link fences, comprising:

a. a cylindrical connector having an outside diameter substantially equal to the inside diameter of the sections of scrap pipe and a length at least about three times its outside diameter,

b. said connector having a protruding annular shoulder located intermediate its ends, the shoulder being of progressively increasing diameter toward its central transverse plane with the diameter of said central plane being only slightly greater than the outside diameter of the end portions of the connector,

c. said connector being adapted to be located in the adjacent ends of sections of scrap pipe in a manner such that the



abutting terminal ends of the scrap pipes are substantially coplanar with the central plane of the shoulder.

4,088,415

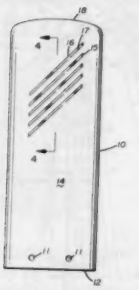
GLARE SCREEN BLADE

Charles W. Syak, Girard, Ohio, assignor to Syro Steel Company, Girard, Ohio

Filed Aug. 31, 1977, Ser. No. 829,525

Int. Cl.[2] E01F *15/00*

U.S. Cl. 404—6 **7 Claims**



1. A glare shield blade, a plurality of which may be used to block headlight glare from one lane of a divided highway to the other, said blade comprising a vertically standing elongated member having a width greater than its thickness and similarly formed front and back surfaces, a plurality of ribs formed on at least one of said front and back surfaces, each of said ribs having at least one surface disposed at an angle to the surface on which it is formed and acting to deflect light at an angle to its source.

4,088,416

ROAD STUDS

Christopher Taylor, Lutterworth, England, assignor to Molehurst Limited, Leicester, England

Filed Sep. 8, 1976, Ser. No. 721,641

Claims priority, application United Kingdom, Sep. 11, 1975, 37412/75

Int. Cl.[2] E01F *9/04*

U.S. Cl. 404—16 **13 Claims**

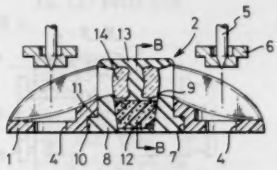
1. A reflecting road stud, comprising:

a surface-mounted body member, said body member having a central hollow region open to at least the top of the body member;

a resilient, deformable material substantially filling said hollow region, said material having an upper portion with at least one side thereof visible from without said body member and a lower portion having a peripheral flange;

a reflector assembly mounted into said at least one visible side, said reflector assembly having at least one substantially vertical reflex reflecting surface;

a substantially vertical slit through said lower portion, coextensive with said at least one visible side of said upper



portion, said slit forming a wiping surface oppositely disposed to and below said at least one reflecting surface; and,

said material being sufficiently deformable to permit said upper portion with said reflector assembly to be momentarily depressed into said lower portion as the road wheel of a vehicle passes over said body member, said at least one reflector surface being wiped clean as it contacts said wiping surface.

4,088,417

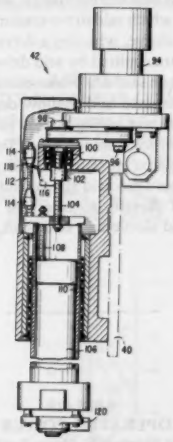
METHOD AND APPARATUS FOR HIGH SPEED, HIGH PRECISION DRILLING AND MACHINING

Wojciech Kosmowski, Fountain Valley, Calif., assignor to Advanced Controls Corp., Santa Ana, Calif.

Filed Mar. 4, 1977, Ser. No. 774,479

Int. Cl.[2] B23B *35/00, 39/16, 47/18*

U.S. Cl. 408—1 BD **23 Claims**



14. A method for high speed precision drilling including the step of feeding a drill into a workpiece at a rate wherein the angle of descent is less than the primary relief angle of said drill by a preselected increment and wherein the chisel point area of said drill extends approximately to or less than one third the radius of said drill,

whereby a large number of workpieces may be drilled with a large number of holes in a small interval of time with a high degree of precision and without the need for a high degree of operator skill.

4,088,418

CHUCK FOR DRIVING TAP OR LIKE ROTARY TOOL

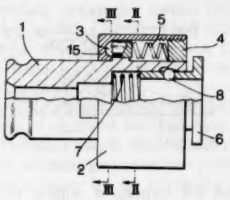
Robert Sidney Dann, Coventry, England, assignor to B. O. Morris Limited, West Midlands, England

Filed Apr. 28, 1977, Ser. No. 791,788

Claims priority, application United Kingdom, Apr. 30, 1976, 17777/76; Sep. 22, 1976, 39201/76

Int. Cl.² B23B *31/02*; B23G *5/16*

U.S. Cl. 408—139 **6 Claims**



1. A chuck for driving a tap or like rotary tool comprising a rotatable shaft having socket-defining means therein co-axial with the axis of rotation of the shaft, the socket-defining means being shaped to impart positive rotational drive to the tap or other tool and to retain the latter in the chuck during a cutting operation, a driving sleeve mounted co-axially on the shaft and spaced radially therefrom to leave an annular space between the shaft and the sleeve, a first flange extending from one of the sleeve and the shaft closing one end of the annular space, at least one drive-transmitting member positioned in the annular space, spring means acting to urge said drive-transmitting member into a shallow depression formed in said first flange, a second flange on the other of the sleeve and the shaft and having an open-ended slot in the circumferential edge of said second flange, said slot having said drive-transmitting member positioned therein, said slot having a side wall extending in a direction radially of said second flange, and forming of a driving surface against which said drive-transmitting member abuts on rotation of said sleeve, whereby a driving torque applied to said sleeve will be transmitted by said drive-transmitting member to said shaft while said drive-transmitting member is urged by said spring means into said shallow depression in said first flange, the force of said spring means permitting said drive-transmitting member to be lifted against the spring force out of said shallow depression in said first flange when the torque being transmitted between said sleeve and said shaft exceeds a limiting value and thereby to interrupt the transmission of torque between said sleeve and said shaft.

4,088,419

WIND OPERATED POWER PLANT

Henry F. Hope, and Stephen F. Hope, both of 2421 Wyandotte Rd., Willow Grove, Pa. 19090

Filed Nov. 2, 1976, Ser. No. 738,133

Int. Cl.² F03D *7/00*

U.S. Cl. 415—2 **10 Claims**

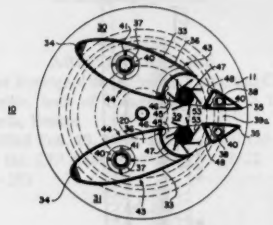
1. A wind operated power plant comprising

a pair of spaced elongated air guiding elements having elongated outer faces and elongated inner faces,

the inner faces of each of said elements being in facing relation to provide an air tunnel,

the inner and outer faces of each element having a air discharge passageway therebetween,

an elongated impeller shaft in each of said passageways and parallel to said inner and outer faces, and



impeller members on each of said shafts and driven by air entering said tunnel and said discharge passageways.

4,088,420

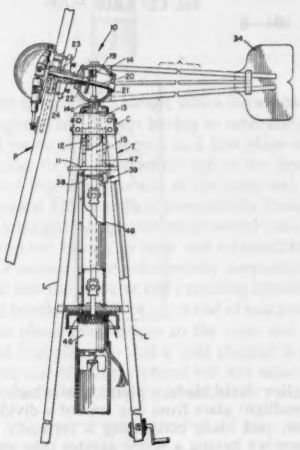
WIND ELECTRIC PLANT

Marcellus L. Jacobs, and Paul R. Jacobs, both of Rte. 13, Box 722, Fort Myers, Fla. 33901

Continuation-in-part of Ser. No. 645,832, Dec. 31, 1975, abandoned, which is a continuation-in-part of Ser. No. 624,281, Oct. 20, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 681,227

Int. Cl.² F03D *7/04*

U.S. Cl. 416—9 **7 Claims**



1. A wind power plant of the type including a support tower and a multiblade, variable pitch propeller supported thereon, the improvement comprising: gear means supported on top of the tower; a propeller shaft connected to the gear means and extending forwardly therefrom at an upwardly inclined angle and parallel to wind direction; multiblade, variable pitch propeller means carried on the propeller shaft and rotatable in a plane perpendicular to wind direction; drive shaft means connected with the gear means and extending downwardly in the tower for connection to suitable means to be driven by the drive shaft means; said gear means including a substantially rounded gear case having a curved top section removably secured thereto, and supported on top of the tower, said propeller shaft supported in bearing means at the front and back of the gear case, a ring gear carried by the propeller shaft inside the gear case between the front and back thereof, and a hypoid bevel gear connected with the drive shaft means and meshed with the ring gear near the top of the ring gear, said drive shaft means disposed with its axis offset to one side of the axis of the

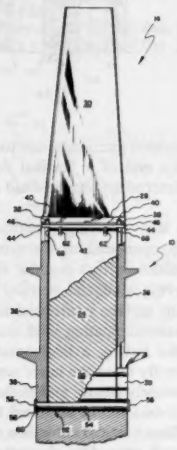
propeller shaft so that wind forces on the propeller means tending to push the propeller means around the axis of the tower are balanced by torque forces between the ring gear and hypoid bevel gear; said drive shaft means including a pinion shaft extending downwardly through the bottom of the gear case and supported in bearing means at the top and bottom of the gear case; and a sleeve sealed at its lower end to the gear case and extending upwardly around the pinion shaft in coaxial relation therewith, thus preventing gear lubricant in the gear case from contacting the pinion shaft, and accordingly reducing the friction drag theron and also eliminating the need for an oil seal between the pinion shaft and gear case.

4,088,421

COVERPLATE DAMPING ARRANGEMENT

Robert F. Hoeft, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 30, 1976, Ser. No. 728,295
Int. Cl.[2] F01D *5/10*
U.S. Cl. 416—193 A **5 Claims**



1. In a gas turbine including a turbine having a rotateable turbine wheel, a plurality of turbine buckets secured to said turbine wheel and extending radially therefrom in an annular array, each said bucket including a platform portion which is spaced radially outwardly from said wheel and is adapted to form, in conjunction with the other platform portions, an inner boundary for a stream of motive fluid flowing across a vane portion of such bucket, a plurality of coverplates secured to said wheel at each axial side of said wheel and extending into close spaced relationship with said platform portions so as to form a generally closed annular plate extending between said wheel and said platforms on each axial side of said wheel, an annular pin extending generally axially between each pair of circumferentially adjacent buckets and radially inwardly of said bucket platforms, means for supporting each pin adjacent each axial end thereof in a position radially inwardly of and in general alignment with the interface of said pin's respective pair of adjacent bucket platforms whereby when said wheel is rotated said pin will be centrifugally urged into abutment with said platforms in fluid blocking relationship to the interface between said adjacent bucket platforms, the improvement comprising:

each said pin including at least one mass eccentrically disposed relative to the axial centerline of said pin and oriented such that when said wheel is rotated,

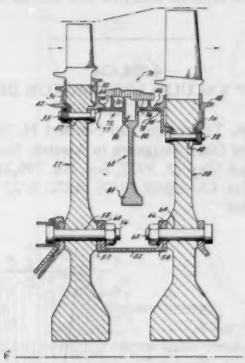
said eccentric mass will generate a moment about said pin axial centerline, with said support means arranged such that said moment will cause said pin to rotate into frictional abutment with a radially outer end portion of at least one coverplate.

4,088,422

FLEXIBLE INTERSTAGE TURBINE SPACER

Jack Reid Martin, Bedford, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Oct. 1, 1976, Ser. No. 728,525
Int. Cl.[2] F01D *5/06*
U.S. Cl. 416—198 A **6 Claims**



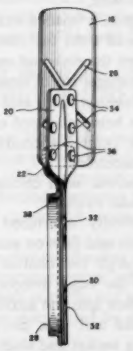
1. An interstage spacer for a multi-stage turbine comprising a hollow disk disposed intermediate turbine stages, said disk including an axially extending flange portion at its outer diameter which abuts the adjacent turbine stages, said flange portion extending radially inward at a point intermediate the ends thereof to form flexible bellows means for absorbing axial growth of the turbine stages, said spacer further including a neck portion extending radially inward from the flexible bellows means and flaring into a hub portion at the inside diameter of the spacer.

4,088,423

HEAVY DUTY RADIATOR COOLING FAN

Patrick J. Dulin, Jackson; Thomas G. Gorman, Hanover; Neil E. Robb, Jackson, and Robert G. Wickham, Clacklake, all of Mich., assignors to Hayes-Albion Corporation, Jackson, Mich.

Filed Oct. 28, 1976, Ser. No. 736,477
Int. Cl.[2] F04D *29/34*
U.S. Cl. 416—210 R **1 Claim**



1. A heavy duty fan assembly, comprising:

a first hub including a central pilot aperture and mounting

apertures and a plurality of integrally formed, radially extending spider arms;

a second hub including an enlarged central aperture and a plurality of integrally formed, radially extending spider arms having a length substantially shorter than that of said spider arms on said first hub;

a plurality of rigid fan blades each extending outwardly from between an aligned pair of said first and second hub arms;

said first and second hubs being maintained in spaced relation;

and said spider arms on said first and second hubs overlying each other.

4,088,424

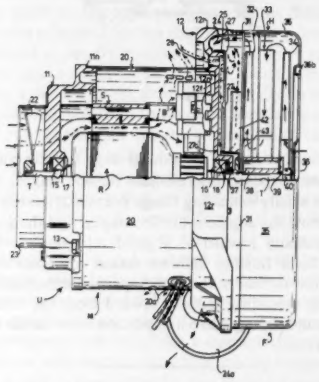
WET PICK-UP VACUUM UNIT MOTOR BEARING AIR SEAL

Robert L. Hyatt, Tallmadge, and Norbert H. Niessner, South Euclid, both of Ohio, assignors to Ametek, Inc., Kent, Ohio

Filed May 23, 1977, Ser. No. 799,241

Int. Cl.[2] F04B *39/06;* **A47L** *9/22*

U.S. Cl. 417—368 **5 Claims**



1. In a wet pick-up type vacuum cleaner fan unit with a cleaning working air centrifugal fan impeller mounted on a fan shaft supported in a lubricated bearing received in a central socket of a fan housing end wall,

said impeller peripherally discharging to a working air outlet of the housing located adjacent to said end wall,

the improvement comprising:

a centrally apertured disk plate circumferentially engaged and sealed upon and spaced from the fanward inner face of the said end wall;

a plurality of angularly spaced auxiliary or sealing air inlets through said wall from the exterior to an air flow space defined between the disk and end wall face;

an auxiliary centrifugal fan of smaller diameter than, and in back-to-back relation with, said working fan impeller,

said auxiliary fan being clamped on said shaft with its inlet eye facing the central aperture of said disk to receive auxiliary air therefrom;

a shield cup received with circumferential spacing in the auxiliary fan inlet eye and

having a centrally apertured flat bottom conjointly clamped with said fans on said shaft, and

extending through the central aperture of the disk to define with the edge thereof a discharge outlet from said flow space into the auxiliary fan eye;

whereby said shield and disk provide structural screening around said bearing socket and shaft, and

said auxiliary fan, shield and disk further moving auxiliary screening and sealing air axially exterior to the socket and on out to a common discharge of said back-to-back auxiliary and working air fans to prevent foam and working air entrained detergent from approaching said bearing.

4,088,425

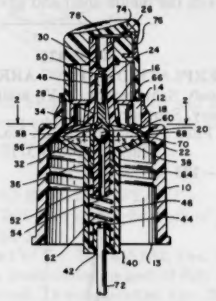
MANUALLY OPERATED PUMP FOR DISPOSABLE CONTAINER

Robert A. Bennett, 170 Sturbridge Rd., Easton, Conn. 06425

Filed Jan. 10, 1977, Ser. No. 758,034

Int. Cl.[2] B05B *1/00, 11/00;* **F04B** *21/04, 7/02*

U.S. Cl. 417—444 **4 Claims**



1. A manually operated pump adapted to be secured detachably to the top open end of a vertical container with fluid therein to expel a metered amount of fluid at each stroke, said pump comprising:

a vertical hollow sleeve having a bottom open end for receiving the top open end of the container, said sleeve having a top section with a circular recess in its surface, said section having a central vertical first bore and also having a bottom surface contoured to receive a convex diaphram and communicating with the bottom of the first bore, said sleeve having a horizontal circular shoulder projecting inwardly from the inner wall of the sleeve and disposed immediately below said bottom surface;

a unit disposed in said sleeve and said first bore, said unit including a hollow vertical extension disposed slidably in the first bore and extending thereabove, said extension containing second and third vertically aligned vertical bores separated by a first horizontal orifice, the top end of the second bore and the bottom end of the third bore being open, said unit further including a central mechanism engaging said extension, said shoulder and said bottom surface of the top section, said mechanism including a horizontal chamber which in vertical cross section has the shape of an ellipse with an elongated horizontal axis, said mechanism having a flexible normally convex diaphram forming the upper surface of the chamber, the diaphram having a central opening peripherally engaging the bottom end of the extension and communicating with said third bore, said mechanism further including a vertical cylinder having a concave rigid enlarged top end forming the lower surface of said chamber and a bottom end with a vertical recess therein, said recess having a top end with a second horizontal orifice, the cylinder having a fourth vertical bore having a top opening in said enlarged top end of the cylinder vertically aligned with said third bore and terminating at the bottom end of the cylinder;

a vertical member slidably disposed in third bore and extending slidably downwardly through said diaphram and the top end of the cylinder part way into said fourth bore, said member having a top disposed tip, said member having a fifth vertical bore extending upwardly from an opening in the bottom end of the member to an enlarged hollow region, said fifth bore communicating with said region, said region being disposed within said chamber and hav-

ing a top portion with slits communicating both with the interior of the region and the interior of the chamber;

a ball movable up and down in the region between a normal bottom position at which it seals the fifth bore and a raised position at which fluid can flow through the second orifice, said fifth bore, said region and said slits into said chamber; and

spring loading means in the cylinder and engaging said member, said means in the absence of downward pressure on said member pressing upwardly upon said member to move said tip into sealing engagement with said first orifice, said member when momentarily manually depressed against the pressure of the spring being momentarily moved downward to provide clearance between said tip and said first orifice.

4,088,426

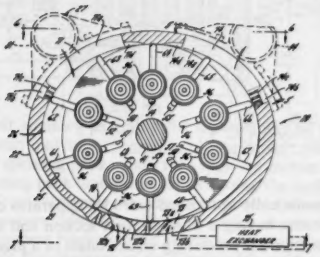
SLIDING VANE TYPE OF COMPRESSOR-EXPANDER HAVING DIFFERENTIAL ECCENTRICITY FEATURE

Thomas C. Edwards, Oviedo, Fla., assignor to The Rovac Corporation, Rockledge, Fla.

Filed May 17, 1976, Ser. No. 686,829

Int. Cl.[2] F25D *9/00;* **F01C** *13/00, 21/00, 11/00*

U.S. Cl. 418—8 **11 Claims**



1. In an air conditioning system, an air conditioning unit including a frame forming a chamber of elliptical cross section having a compressor side and an expander side and having a smoothly continuous inner wall, end bells secured to the frame for enclosing the chamber, a rotor journaled in the end bells and having vanes cooperating with the wall of the chamber and the end bells to define enclosed compartments, the compressor side and the expander side each having an inlet port and an outlet port formed in the continuous inner wall, means for connecting a heat exchanger between the compressor side outlet port and the expander side inlet port, the heat exchanger being remote from the expander side outlet port, means for conducting air to the compressor side inlet port so that upon driving of the rotor the air (1) is positively compressed and heated in the compressor side, (2) releases heat in the heat exchanger, and (3) is positively expanded and cooled in the expander side for discharge in the cold state from the expander side outlet port, the elliptical eccentricity of the expander side being less than the elliptical eccentricity of the compressor side, the elliptical eccentricity of the chamber on the compressor side being less than 0.72, the compressor side outlet port being formed by outwardly flaring curved surfaces so that the air discharged radially through the compressor side outlet port follows a curved path which varies from substantially tangential to substantially radial in the direction of vane movement, the expander side inlet port being formed of inwardly convergent curved surfaces so that the air entering radially through the expander side inlet port follows a curved path which varies from substantially radial to substantially tangential in the direction of vane movement for minimization of throttling loss at the respective ports.

4,088,427

ROTORS FOR A SCREW ROTOR MACHINE

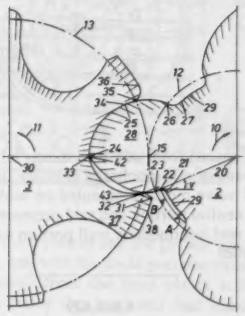
Kaj Bengt Ingemar Emanuelsson, Wilrijk, Belgium, and Sven Evald Eriksson, Orebro, Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Continuation-in-part of Ser. No. 551,072, Feb. 20, 1975, abandoned. This application Sep. 13, 1976, Ser. No. 722,645

Claims priority, application Sweden, Jun. 24, 1974, 7408229

Int. Cl.[2] F04C *17/12*

U.S. Cl. 418—201 **16 Claims**



5. A pair of cooperating rotors for a screw rotor machine comprising a main rotor having a dedendum and a gate rotor having an addendum, each provided with helical lands extending on both sides of respective pitch circles of the rotors and intervening grooves, said lands of the rotors having first and second flanks; said first flank of the gate rotor comprising a first portion extending from the bottom of the gate rotor groove substantially to the pitch circle of the gate rotor and being generated by the main rotor land and a second portion located outside the pitch circle of the gate rotor and extending substantially to the crest of the gate rotor; said first flank of the main rotor comprising a first portion located outside the pitch circle of the main rotor and a second portion (21–23) located inside the pitch circle of the main rotor, said second portion being profiled so that a tangent to said second portion through an arbitrary point on said portion deviates at an angle of less than 20° from a radius from the center of said main rotor through said arbitrary point at every position of said arbitrary point between the pitch circle of the main rotor and a point located two-thirds of the distance from the pitch circle and the dedendum circle.

4,088,428

DISCHARGE VALVE ASSEMBLY FOR A COMPRESSOR

James Edward Bannister, and Ralph Fredrick Connor, both of Evansville, Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Aug. 12, 1976, Ser. No. 713,709

Int. Cl.[2] F01C *21/12;* **F04B** *21/02;* **F16K** *15/14*

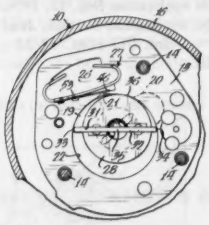
U.S. Cl. 418—270 **9 Claims**

1. In a rotary compressor having means defining a compression chamber, a low suction pressure inlet to said chamber, a high discharge pressure outlet from said chamber and compressor means in said chamber between said inlet and said outlet, a discharge check valve and retainer means assembly, comprising:

wall means defining an elongated valve chamber communicating with said discharge pressure outlet having first and second arcuate end wall portions and an intermediate wall portion therebetween intersected by said discharge pressure outlet;

a valve retainer comprising a relatively stiff but resilient strip having a central portion and first and second arcuate end portions corresponding to said first and second arcuate

end portions of said valve chamber, said strip end portions each having a free undeformed radius greater than that of the corresponding wall end portions for resilient retention of said retainer in said valve chamber by distortion of said strip end portions, said strip central portion having a part



thereof spaced from said wall means intermediate portion in the area of said discharge pressure outlet; and

a resilient valve member mounted on said retainer between its said central portion and said pressure outlet and biased against said intermediate wall portion to overlie said pressure outlet.

4,088,429

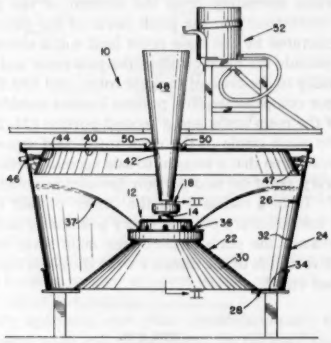
SPHERICAL SHOT PRODUCING MACHINE

Eugene L. Helton, Peoria, and Gerald P. Simmons, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 689,612, May 24, 1976, abandoned. This application Jul. 20, 1977, Ser. No. 817,329

Int. Cl.[2] B29C *23/00;* B22D *23/08*

U.S. Cl. 425—8 **6 Claims**



1. An apparatus for producing generally spherical metal pellets comprising:

frame means;

a vessel rotatably mounted relative said frame means;

means for rotating said vessel relative said frame means;

funnel means fixed relative said frame means for supplying moten metal to said vessel, the rotation of the vessel causing molten metal to be thrown outwardly therefrom in the form of generally spherical droplets;

first spray means fixed relative said frame means and disposed below said rotatable vessel for spraying cooling liquid generally upwardly through the path of the generally spherical droplets thrown outwardly from said vessel to solidify said generally spherical droplets whereby generally spherical metal pellets are formed; and

receiving means fixed relative said frame means for receiving pellets, said receiving means comprising a frusto-conical outer wall, an inner wall, and a horizontally oriented bottom wall interconnecting said inner and outer walls, the frustoconical outer wall being positioned generally about the vessel and tapering inwardly toward the bottom wall so that said generally spherical metal pellets contact the inner surface of said outer wall and fall downwardly therealong to said bottom wall, said cooling liquid from said first spray means further directed against an inner surface of said frustoconical outer wall.

4,088,430

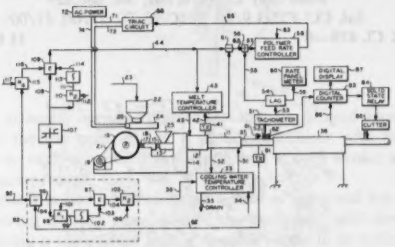
AUTOMATIC CONTROL OF EXTRUSION

Richard F. Giles, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 12, 1976, Ser. No. 666,287

Int. Cl.[2] B29F *3/08*

U.S. Cl. 425—144 **16 Claims**



1. Automatically controlled extruder apparatus comprising:

an extruder having a plasticization section and a long land die section for producing an extrudate of a predetermined cross section, means operatively associated with said plasticization section and said long land die section for moving material through said plasticization section and then through said long die section, heating means operatively associated with said plasticization section for supplying heat to said material in said plasticization section so that said material is molten at the inlet of said long land die section, cooling means operatively associated with said long land die section for removing heat from said material in said long land die section so that at least the outer portions of the extrudate solidify before leaving said long land die section;

feed means operatively associated with said extruder for feeding particles of said material into said plasticization section at a manipulatable rate; and

automatic control means operatively associated with said extruder comprising means for measuring the actual surface temperature of said extrudate at least closely adjacent to the exit of said long land die section and establishing a first signal representative thereof, means for establishing a second signal representative of the desired surface temperature of said extrudate at said exit of said long land die section, means responsive to said first and second signals for establishing a third signal which bears a predetermined relationship to the magnitude and sign of the difference between said actual surface temperature and said desired surface temperature, and means responsive to said third signal for adjusting said cooling means to manipulate the rate of removing heat from said material in said long land die section to maintain said actual surface temperature at least substantially equal to said desired surface temperature.

4,088,431

MELT SPINNING FILTER

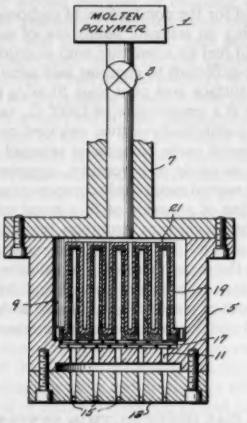
Archibald Horace Johnson, and Ian Peter Sanderson, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 29, 1975, Ser. No. 572,924

Claims priority, application United Kingdom, May 7, 1974, 20009/74; May 7, 1974, 20010/74

Int. Cl.[2] B01D *39/00;* **D01D** *3/00*

U.S. Cl. 425—198 **4 Claims**



1. A melt spinning assembly for the spinning of synthetic thermoplastic polymer comprising a spinning pack, filter within the spinning pack means for supplying molten polymer to the spinning pack and means for extruding the molten polymer therefrom; wherein the filter comprises a shaped, rigid porous structure comprising inert granular material bonded with a permanent binding agent which remains present within the filter for the duration of its filtering life, said permanent binding agent being selected from the group consisting of sodium silicate cured with carbon dioxide gassing, ethyl silicate cured by ammonia gassing, silica sol cured by ammonia gassing and aluminum phosphate derived from complex phosphates of aluminum containing at least one chemically-bound hydroxy compound ROH, where R is hydrogen or an organic group, together with at least one anion from the group consisting of a carboxylic acid or of a strong inorganic acid other than an oxyphosphorous acid.

4,088,432

MOLD LOCKUP MECHANISM

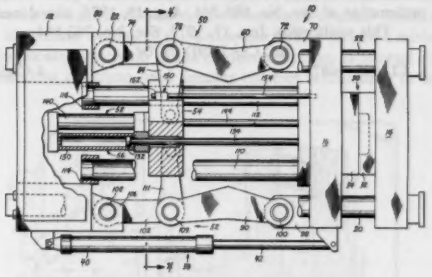
Robert E. Farrell, Springfield, Mass., assignor to Package Machinery Company, East Longmeadow, Mass.

Filed Mar. 1, 1977, Ser. No. 773,300

Int. Cl.[2] B29F *1/00;* **B30B** *1/16;* **B29C** *3/06*

U.S. Cl. 425—451.6 **15 Claims**

1. A molding machine comprising: first and second stationary end platens and a third movable platen between the end platens and reciprocable toward and away from the first end platen, separable mold portions mounted respectively on the first stationary platen and the third movable platen for molding an article when the first and third platens are moved close together and the mold portions are closed and locked up, a toggle linkage mechanism interposed between the second stationary platen and the movable third platen for locking up the mold portions when the first and third platens are close together, the toggle mechanism extending between the second and third platens and including a front linkage pivotally connected to the third movable platen and a rear linkage pivotally connected to the second stationary platen and having a pivotal joint with the front linkage, the toggle mechanism being operable to move toward a toggle position and press the mold portions closed and locked up and operable to move away from the toggle position and pull the mold portions open; a movable crosshead operatively connected with the front and rear linkages of the toggle mechanism to move the linkages in and out of the toggle position, the crosshead with the mold portions open being positioned between the second and third platens



and between the third platens and the pivotal joint of the front and rear linkages, and with the mold portions closed for lockup being movable away from the third platen and toward the second platen to move the front and rear linkages into the toggle position; and actuating means connected to the crosshead for urging the crosshead away from the third platen and moving the linkages into the toggle position for lockup.

4,088,433

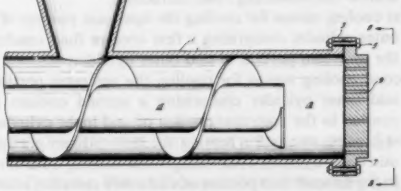
EXTRUSION DIE

Howard D. Simpson, Irvine, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Feb. 25, 1977, Ser. No. 772,150

Int. Cl.[2] B29F *3/04*

U.S. Cl. 425—464 **15 Claims**



1. An extrusion die having at least 50 orifices therein for the passage of extrudable material therethrough, said orifices being of equivalent cross-sectional area in the plane of the external die face and being arranged such that the orifice density in any first circle, drawn on said die face so that:

(a) the center of said die face is the origin of said circle,

(b) said circle encompasses no more than 90% of the orifices on said die face, and

(c) said circle is defined by a radius of $\frac{1}{4}$ inch multiplied by a positive integer greater than 1,

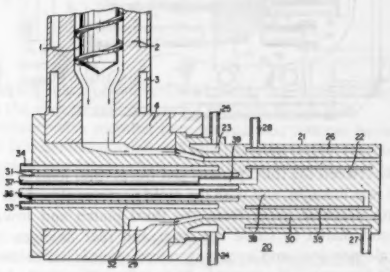
is greater than the orifice density in any concentric second circle drawn on the die face of radius smaller than that of said first circle, but of length equal to $\frac{1}{4}$ inch multiplied by a positive integer.

4,088,434

DIE FOR CONTINUOUSLY EXTRUDING HOLLOW ARTICLES FROM THERMOSETTING RESINS

Yoshihiko Fukuda, Kure; Hidefumi Ishimori, Hiroshima; Masafumi Toyomatsu, Kohnan; Masayoshi Tsubone, Kawanishi; Hideki Mizuguchi, and Hideo Masuda, both of Hiroshima, all of Japan, assignors to The Japan Steel Works Ltd., Tokyo and Dai Nippon Toryo Co., Ltd., Osaka, both of, Japan

Continuation of Ser. No. 605,244, Aug. 18, 1975, abandoned.
This application Jan. 17, 1977, Ser. No. 763,804
Int. Cl.[2] B29D *23/04*
U.S. Cl. 425—467 4 Claims



1. A die for continuously extruding hollow articles from thermosetting resins comprising:

an elongate outer cylinder having a smooth inner surface;

an elongate inner cylinder having a smooth outer surface disposed coaxially within said outer elongate cylinder and forming therebetween an unobstructed annular extrusion passage between the smooth outer surface of said inner cylinder and the smooth inner surface of said outer cylinder, said outer and inner cylinders each having upstream portions forming an upstream end of said die for receiving thermosetting resins from an extruder barrel, said outer and inner cylinders each having downstream portions forming a downstream end of said die for discharging a hollow thermosetting resin extrudate;

first cooling means for cooling the upstream portion of said outer cylinder comprising a first coolant fluid conduit in the upstream portion of said outer cylinder;

second cooling means for cooling the upstream portion of said inner cylinder comprising a second coolant fluid conduit in the upstream portion of said inner cylinder;

first heating means for heating the downstream portion of said outer cylinder comprising a first heating fluid conduit in the downstream portion of said outer cylinder, said first heating fluid conduit being axially spaced from said first cooling fluid conduit; and

second heating means for heating the downstream portion of said inner cylinder comprising a second heating fluid conduit in the downstream portion of said inner cylinder, said second heating fluid conduit being axially spaced from said second cooling fluid conduit, said die further including means operatively associated with said die for securing said die to an extruder having an extruder barrel such that said outer and inner cylinders are disposed at right angles to the extruder barrel said first and second heating fluid conduits having inlets so located that the respective conduits are filled with heating medium in a counter flow fashion relative to the flow direction of such thermosetting resins to be extruded.

4,088,435

METHOD FOR THE COMBUSTION OF CARBONACEOUS FUELS UTILIZING HIGH TEMPERATURE STABLE CATALYSTS

Saul G. Hindin, Mendham, and George R. Pond, Elizabeth, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Division of Ser. No. 423,094, Dec. 10, 1973, Pat. No. 3,966,790.
This application Apr. 5, 1976, Ser. No. 673,913,
Int. Cl.[2] F23D *19/00*
U.S. Cl. 431—7 4 Claims

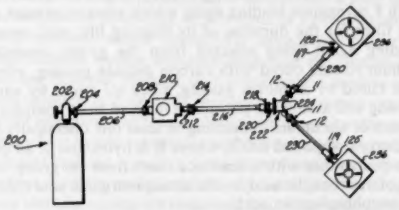
1. A method for the combustion of carbonaceous fuel comprising: forming an intimate admixture of said fuel and air; contacting said fuel air admixture with an oxidation catalyst at a temperature sufficient to combust said admixture, said catalyst having a surface area of at least 20 m^2/g after calcination for two hours at a temperature of 1200° C., said catalyst comprising: (a) a catalytically-active, calcined composite of alumina; a first metal oxide component selected from the group consisting of an oxide of chromium, tungsten, and mixtures thereof; and a second metal oxide component selected from the group consisting of an oxide of (i) a metal selected from the group consisting of calcium, strontium, barium, silicon, tin, and mixtures thereof and (ii) mixtures of zirconium with a metal selected from the group consisting of calcium, strontium, barium, silicon, tin, and mixtures thereof; and (b) a catalytically-effective amount of platinum group metal added thereto; after calcination of said composite at a temperature of at least 500° C.

4,088,436

GAS DISTRIBUTION SYSTEM

Ernest Alferes, Honolulu, Hi., assignor to The Hansen Manufacturing Company, Cleveland, Ohio

Filed Mar. 11, 1976, Ser. No. 666,016
Int. Cl.[2] F23H *5/02*
U.S. Cl. 431—21 3 Claims



1. An apparatus for use in association with a source of gas under pressure and a plurality of gas burning appliances, said apparatus comprising a main feed line having one end adapted to be connected with the source of gas, a manifold connected with another end of said main feed line to enable gas to flow from the source of gas through said main feed line to said manifold, a plurality of secondary feed lines, a first plurality of quick disconnect coupling assemblies for connecting first end portions of each said secondary feed lines in fluid communication with said manifold, each coupling assembly of said first plurality of coupling assemblies including a socket assembly connected with said manifold and a plug connected with a first end portion of one said secondary feed lines, each of said socket assemblies including a socket housing which at least partially defines a socket chamber connected in fluid communication with said manifold and adapted to telescopically receive a plug, a socket valve member disposed in said socket housing and movable between an open position enabling gas to flow from said manifold through said socket chamber and a closed position blocking a flow of gas from the manifold through the socket chamber, a socket valve spring for urging the socket valve member toward the closed position, and a plurality of selectively releasable locking elements for holding

a plug in the socket chamber, each of said plugs including a leading end portion for effecting movement of a socket valve member from the closed position to the open position against the influence of a socket valve spring to enable gas to flow from the manifold to the secondary feed line connected with the plug upon insertion of the plug into a socket chamber, said apparatus further including a second plurality of quick disconnect coupling assemblies for connecting second end portions of each of said secondary feed lines in fluid communication with an associated one of the gas burning appliances, each coupling assembly of said second plurality of coupling assemblies including a socket assembly connected with the second end portion of one of said secondary feed lines and a plug connected with the associated one of the gas burning appliances, each socket assembly of said second plurality of socket assemblies including a socket housing which at least partially defines a socket chamber connected in fluid communication with the second end portion of one of said secondary feed lines and adapted to telescopically receive a plug connected with one of the gas burning appliances, a socket valve member disposed in said socket housing and movable between an open position enabling gas to flow from one of the secondary feed lines through said socket chamber and a closed position blocking a flow of gas from the one secondary feed line, a socket valve spring for urging the valve member toward the closed position in the socket housing of one of the socket assemblies of the second plurality of coupling assemblies, and a plurality of selectively releasable locking elements for holding a plug connected with one of the gas burning appliances in the socket chamber, each of the plugs of the second plurality of coupling assemblies including a leading end portion for effecting movement a socket valve member from the closed position to the open position against the influence of a socket valve spring to enable gas to flow from a secondary feed line to the gas burning appliance connected with the plug into a socket chamber of a socket assembly of the second plurality of coupling assemblies, said apparatus further including a plurality fusible safety cutoff means connected with the plugs of one of said pluralities of coupling assemblies for effecting a closing of the socket valves associated with the plugs when the associated coupling assembly is exposed to excessive heat to hereby retard propagation of a flame wave through said one of said pluralities of coupling assemblies in the event of a malfunctioning of a gas burning appliance, and means connected with one of said feed lines for retarding flame propagation and limiting the flow of gas through said one of said feed lines, said means for retarding flame propagation and limiting gas flow including a casing through which gas supplied to said one of said feed lines flows, a body of porous material having a plurality of openings therein for retarding the passage of flame through the body of porous material, a valve element movable in the direction of flow of gas through said casing from an open condition in which said valve element is ineffective to block the flow of gas through said casing to a closed condition in which said valve element is effective to block the flow of gas through said casing, and valve element spring means for urging said valve element toward the open condition, said valve element being movable from the open condition to the closed condition against the influence of said valve element spring means under the influence of a predetermined flow rate of gas through said casing.

4,088,437

COMBUSTION CHAMBER

Immanuel Holzapfel, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

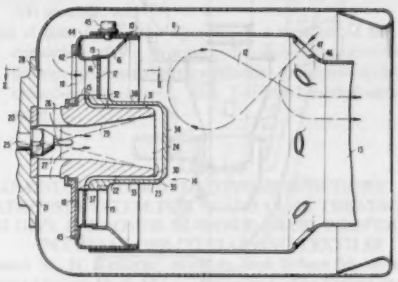
Filed Sep. 8, 1976, Ser. No. 721,218

Claims priority, application Germany, Sep. 25, 1975, 2542719

Int. Cl.² F23D *11/04*

U.S. Cl. 431—161 **30 Claims**

1. A combustion chamber, comprising a flame tube means forming a combustion zone, an evaporator means projecting into said combustion zone, said evaporator means being provided with a first evaporator channel means to which air and fuel are separately fed, and including deflection surface means arranged at an end of said first evaporator channel means, said deflection surface means being operable to deflect the fuel/air mixture to all sides in a direction generally opposite the main flow direction prevailing in said first evaporator channel means, characterized by an annular channel partly surrounding said first evaporator channel means, said annular channel being in communication with said first evaporator channel means in an immediate vicinity of the deflection surface means, a mixing zone located upstream of the combustion zone, as viewed in a main flow direction, said annular channel terminating in discharge aperture means for providing an essentially outwardly directed discharge from said annular channel into the mixing zone, said discharge aperture means extending radially outwardly at approximately a right angle to a longitudinal axis of the annular channel, said mixing zone being formed by an annular space between an outer wall of the evaporator means and an intermediate wall of the flame tube means and being traversed by air, and radially extending web means arranged in said annular space within a first and a second plane, the discharge aperture means of the annular channel terminating substantially between said web means.



4,088,438

APPARATUS FOR THE HEAT TREATMENT OF FINE-GRAINED MATERIAL

Herbert Deussner; Hubert Ramesohl, both of Bensberg-Refrath, and Horst Herchenbach, Troisdorf, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Sep. 17, 1976, Ser. No. 724,593

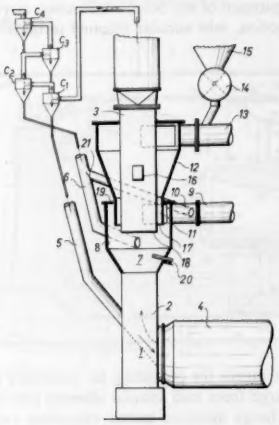
Claims priority, application Germany, Sep. 18, 1975, 2541564

Int. Cl.² F27B *7/02, 15/00*

U.S. Cl. 432—106 **15 Claims**

1. An apparatus for the heat treatment of fine-grained material comprising a preheater composed of a plurality of superimposed cyclones, a rotary kiln in series with said preheater, an exhaust conduit connected to said rotary kiln and having a combustion zone therein, means connecting the gas discharge from one of the intermediate cyclones into said combustion zone, said exhaust conduit including upper and lower concentric conduits, the upper conduit being of smaller diameter than said lower conduit and having its lower end received in spaced relation to the upper end of the lower conduit and terminating

at said combustion zone, a fuel feed conduit disposed between said lower end of said upper conduit and said upper end of said lower conduit and being spaced from both, and means for delivering fuel into said fuel feed conduit.



4,088,439

TANGENTIALLY GAS FIRED MUFFLE

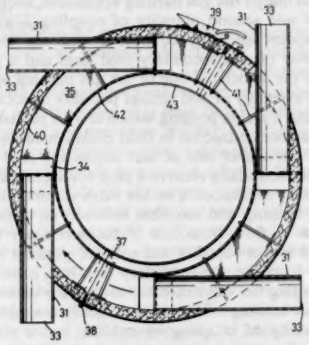
David George Dohren, Tarleton, England, assignor to Cooperheat, Southport, England

Filed Oct. 13, 1976, Ser. No. 731,951

Claims priority, application United Kingdom, Sep. 14, 1976, 38006/76

Int. Cl.[2] F24J 3/00; F27B 13/00

U.S. Cl. 432—225 11 Claims



1. A tangentially gas fired muffle comprising an annular housing, said housing defining first and second annular chambers divided by a ring of perforate or expanded heat resistant material, said first annular chamber being provided with circumferentially spaced inlet and outlet ports, said inlet ports being in the form of immersion tubes directed tangentially into said first chamber, an atmospheric gas burner being located in each of said immersion tubes for directing its products of combustion into said first chamber, and said outlet ports being located adjacent said immersion tubes for discharging the products of combustion of the gas burners in previous tubes, whereby said ring contains the combustion processes within said first chamber and acts as a radiant for dissipating heat uniformly onto the surfaces of pipe sections bounded, in use, by said second annular chamber.

4,088,440

TRANSFER PRINTING OF TREATED CELLULOSICS

Erwin Leimbacher; Otto Siegrist, and Alfred Steiger, all of Wattwil, Switzerland, assignors to Heberlein Textildruck AG, Wattwil, Switzerland

Continuation of Ser. No. 493,478, Jul. 31, 1974, abandoned. This application May 3, 1976, Ser. No. 682,672

Claims priority, application Switzerland, Aug. 3, 1973, 11291/73; Jun. 11, 1974, 7922/74; Jun. 18, 1974, 8296/74

Int. Cl.[2] D06P *5/00, 5/20*

U.S. Cl. 8—2.5 A 43 Claims

1. A process for the combined dyeing or printing and finishing of a textile consisting at least partially of cellulose fibers, which comprises:

(1) impregnating said textile with an aqueous solution containing:

(a) a sufficient amount of a cross-linking agent capable of reacting with and cross-linking the hydroxy groups of the cellulose, and

(b) a sufficient amount of at least one dyeing auxiliary agent which improves the dyestuff receptivity of said textile and the dyestuff fixation therein and which is selected from the group consisting of aromatic compounds, halogenated aromatic compounds and non-ionic oxyalkylated compounds:

(2) pre-drying the resulting impregnated textile;

(3) dyeing or printing the resulting predried textile in the dry state with sublimable dyestuffs by a transfer-printing process which comprises contacting the predried textile with the sublimable dyestuffs which have been coated onto a support paper and heating; and

(4) simultaneously with step (3) or thereafter subjecting the textile to heat treatment in the presence of a sufficient amount of an acidic or potentially acidic cross-linking catalyst to promote said cross-linking of said hydroxy groups and to produce wash-resistant fixation of the dyestuffs and the cross-linking agent in the fibers of the textile.

4,088,441

DYESTUFF COMPOSITION FOR THE DYEING OR PRINTING OF CELLULOSE FIBER MATERIALS

Fritz Meininger, Frankfurt am Main; Walter Noll, Bad Soden, Taunus, and Arno Spange, Eschborn, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 558,906, Mar. 17, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,589

Claims priority, application Germany, Mar. 18, 1974, 2412964

Int. Cl.[2] D06P *1/38*

U.S. Cl. 8—1 P 6 Claims

1. A dyestuff composition for the dyeing or printing of natural or regenerated cellulose fiber materials, consisting of 20 to 70 percent by weight of C.I. Reactive Blue 19 sodium salt, anthraquinone-2-sulfonic acid sodium salt, a sodium salt of the condensation product of naphthalene sulfonic acid with formaldehyde, a condensed phosphate sodium salt selected from the group consisting of sodiumhexametaphosphate and penta-sodiumtriphosphate, and a dust-preventing agent.

4,088,442

TEMPORARY CARRIERS AND A PROCESS FOR DRY TRANSFER PRINTING

Bernard Hugelin, Gaillard, France; Claude-Alain Blanc, Bernex, and Charles Serex, Moillesulaz, both of Switzerland, assignors to Sublistatic Holding S. A., Glaris, Switzerland

Continuation of Ser. No. 547,093, Feb. 4, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 672,960

Claims priority, application Switzerland, Feb. 28, 1974, 2814/74; Mar. 19, 1974, 3763/74; Apr. 11, 1974, 5159/74

Int. Cl.[2] D06P *5/20*

U.S. Cl. 8—2.5 A 10 Claims

1. In a method for the dry transfer printing or dyeing of synthetic materials which comprises bringing the synthetic material to be dyed or printed into contact with a flexible temporary carrier sheet printed with printing ink containing at least one dyestuff which vaporizes or sublimes under transfer conditions, heating the thus contacted material and carrier sheet to a temperature of from 150° to 250° C for a period of time sufficient to effect transfer of dyestuff from the carrier to the said material and separating the said material from the said carrier sheet, the improvement according to which

(a) the material is synthetic polyamide material having a thickness of at least 0.9 mm.,

(b) the method is conducted in the absence of in vacuo conditions,

(c) the heating step is carried out for a period of from 30 to 300 seconds, and

(d) at least one of the dyestuffs is a member of the group consisting of 1,4-di(isopropylamino)-anthraquinone, 1,5-di(isopropylamino)-anthraquinone, 1-amino-4-hydroxy-2-chloro-anthraquinone, and 1-amino-2-methyl-anthraquinone.

4,088,443

ALUMINUM CHLORHYDROXIDE-PHOSPHORIC ACID CATALYST SYSTEM FOR FLASH CURE TREATMENTS TO GIVE IMPROVED DURABLE-PRESS PROPERTIES IN CELLULOSE-CONTAINING TEXTILES

Russell M. H. Kullman, Metairie, and Robert M. Reinhardt, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Feb. 6, 1976, Ser. No. 656,033

Int. Cl.[2] D06M *13/34;* B01J *21/02*

U.S. Cl. 8—116 P 7 Claims

1. A process for preparing cellulose-containing textiles with improved durable-press properties comprising:

(a) padding a cellulose-containing fabric with an aqueous solution each 100 parts by weight of which contain 0.3 part to about 1.0 part of $Al_2(OH)_5Cl$ (i.e., about 2 to 6 mmol of $Al_2(OH)_5Cl$ per 100g of solution), 0.75 as many parts by weight of H_3PO_4 for each part of $Al_2(OH)_5Cl$, and about 7.5 parts to 15 parts of a finishing agent selected from the group consisting of formaldehyde and formaldehyde-amide adducts;

(b) drying the fabric from (a); and

(c) flash curing the fabric from (b).

4,088,444

PROCESS AND APPARATUS FOR STERILIZING CONTAINERS

Thomas D. Byrne, Wheeling, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jun. 9, 1976, Ser. No. 694,274

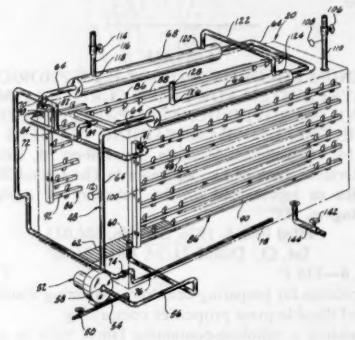
Int. Cl.[2] A61L *1/00, 3/00;* A23L *3/10*

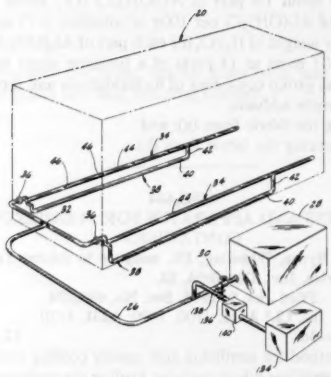
U.S. Cl. 21—56 12 Claims

1. In a method for sterilizing and rapidly cooling containers in a stream sterilizer which includes loading the containers into a chamber, displacing air from the chamber by steam, heating the chamber with steam until the required sterilization temperature and pressure are reached and maintaining said sterilization conditions for a period of time sufficient to sterilize the containers, the improvement which comprises partially filling the chamber with a heat exchange liquid to form a bath of heat exchange liquid and to prime a closed loop liquid recirculation system in said sterilizer while preventing the containers from becoming immersed within said chamber bath, circulating the heat exchange liquid in said closed recirculation system during sterilization of the containers, sterilizing the heat exchange liquid in the chamber as the containers are sterilized, and subsequent to said sterilization period of time circulating the sterilized heat exchange liquid and spraying the sterilized heat exchange liquid over the sterilized containers and cooling the recirculating sterilized heat exchange liquid at a preselected

rate whereby the sterilized containers are cooled with recirculated sterilized liquid and without thermal shock.

8. In a steam sterilizer for sterilizing and rapidly cooling containers, said sterilizer including an enclosed chamber including an access door at one end thereof through which containers to be sterilized may be brought into and moved out of said chamber, means for providing controlled entry and exit of air from said chamber, a steam piping means positioned in said chamber, a plurality of apertures arranged in spaced relation therealong for spraying steam from said pipe to a void space in said chamber in which containers to be sterilized may be positioned, an elongate water spray header positioned in said chamber, said header including a plurality of spray nozzles positioned in spaced relation therealong, and a drain at the bottom of said chamber for removing liquid therefrom, the improvement which comprises a recirculation system adapted





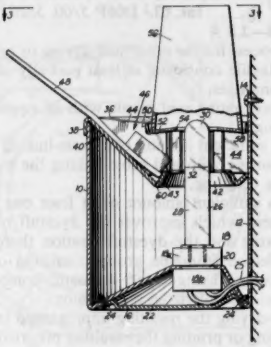
to move a quantity of sterilized water in a closed loop through the sterilizer during operation thereof, said closed loop having a heat-up loop and a cool-down loop, said closed loop including a bath of heat exchange liquid within the enclosed chamber, said bath being within both said heat-up loop and said cool-down loop and being of a depth such that containers are not immersed therewithin while positioned within said void space or during their movement into or out of said chamber, said heat-up loop including means for circulating water that is sterilized through the operation of said steam piping means, said cool-down loop including means for recirculating said sterilized water and for spraying said sterilized water from said header to said void space and to containers therewithin, and said cool-down loop including means for eliminating thermal shock to said containers during cool-down thereof after sterilization.

4,088,445

COMBINATION NIGHT LIGHT AND STERILIZING HOLDER FOR TOILET ARTICLES

Douglas G. Ellis, 10708 SE. Home, Milwaukie, Oreg. 97222

Filed Jan. 13, 1977, Ser. No. 758,942
Int. Cl.[2] A61L *3/00*
U.S. Cl. 21—83 **3 Claims**



1. A combination night light and sterilizing holder for toilet articles comprising

(a) a hollow body portion having surrounding side walls and a bottom wall,

(b) a top wall on said body member having a vertical opening therein,

(c) radially extending vertical partition means on said top wall around a portion of said opening and forming pockets which are open at their outward ends for receiving toilet articles and which are also open at their inward ends,

(d) means on said cover arranged to limit inward positioning of toilet articles in said pockets,

(e) shelf means on said cover disposed above said vertical opening for supporting a container in inverted relation,

(f) a vertical opening in said shelf means aligned vertically with the opening in said top wall,

(g) a light bulb socket on said bottom wall,

(h) and a sterilizing light bulb in said socket projecting through said opening in the top wall and extending at its upper end to a height adjacent said opening in the shelf means,

(i) said bulb having a lower coated portion serving as a night light,

(j) said bulb having an upper uncoated portion extending from its upper end down to an area adjacent the inward open ends of said pockets to direct sterilizing rays through the open inner ends of said pockets to sterilize toilet articles therein and also to direct sterilizing rays upward through the opening in said shelf means to sterilize a container on the shelf means.

4,088,446

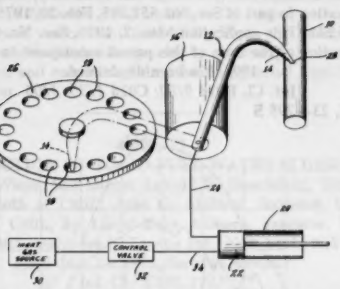
METHOD AND APPARATUS FOR CLEANSING RESIDUE FROM A SAMPLE TRANSFER PROBE

Bernhard Werner Huber, Uberlingen, and Rolf Günther Arnold Tamm, Salem, both of Germany, assignors to Bodenseewerk Perkin-Elmer & Co., GmbH, Uberlingen, Germany

Filed May 16, 1977, Ser. No. 797,370
Claims priority, application Germany, May 25, 1976, 2623307
Int. Cl.[2] G01N *1/14*
U.S. Cl. 23—230 R **8 Claims**

1. In an atomic absorption spectrometer of the type wherein a probe is automated to transfer samples between individual sample containers and a hollow graphite furnace in which each transferred sample is atomized, a method of cleansing sample residue from the probe comprising the steps of:

bringing the tip of the probe into thermal contact with the graphite furnace at the sample transfer position of the



probe to heat the probe tip to atomize the sample residue therefrom after each sample transfer to the graphite furnace.

4,088,447

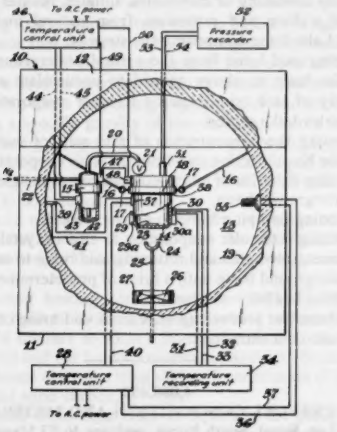
ADIABATIC CALORIMETER APPARATUS AND METHOD FOR MEASURING THE ENERGY CHANGE IN A CHEMICAL REACTION

Lynn Charles Walker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 624,613, Oct. 22, 1975, abandoned. This application Jan. 27, 1977, Ser. No. 763,261

Int. Cl.[2] G01K *17/00;* **G01N** *25/20*

U.S. Cl. 23—230 R **11 Claims**



1. A method for measuring the energy of a chemical reaction in an adiabatic calorimeter apparatus, the calorimeter apparatus including a reaction chamber defined by a spherical cavity enclosed by an insulated box structure, the reaction chamber being filled with a gas atmosphere, the method comprising the steps of:

placing a first chemical reactant in an auxiliary vessel located in the spherical cavity;

placing a second chemical reactant in a reaction vessel located in the geometric center of the spherical cavity;

heating the auxiliary vessel, the reaction vessel, and the gas atmosphere to a predetermined initial temperature;

transferring the first chemical reactant from the auxiliary vessel to the reaction vessel to initiate a chemical reaction in the reaction vessel;

continuously stirring the reactants in the reaction vessel;

sensing any temperature difference between the gas atmosphere and the reaction vessel, as the reactants in the reaction vessel are undergoing a temperature change from the initial temperature;

continuously maintaining the temperature of the gas atmosphere in equilibrium with the temperature of the reaction vessel until the chemical reaction taking place in the reaction vessel is completed;

measuring the temperature change which the reactants in the reaction vessel are undergoing during the chemical reaction; and

recording the temperature change of the reactants in the reaction vessel with a temperature recorder unit.

4,088,448

APPARATUS FOR SAMPLING, MIXING THE SAMPLE WITH A REAGENT AND MAKING PARTICULARLY OPTICAL ANALYSES

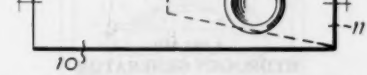
Jan Evert Lilja, Frodes vag 17, 291 65 Kristianstad, and Sven Erik Lennart Nilsson, Hasselvagen 17, Kristianstad, both of Sweden

Filed Sep. 16, 1976, Ser. No. 724,054

Claims priority, application Sweden, Sep. 29, 1975, 7510863

Int. Cl.[2] G01N *33/16, 21/24*

U.S. Cl. 23—259 **16 Claims**



1. A cuvette for sampling a fluid, mixing the sample with a reagent, and directly making optical analyses of the sample mixed with the reagent, comprising a body member including two planar surfaces defining an optical path and placed at a predetermined distance from one another to determine the optical path length and to define at least one cavity having an inlet communicating the at least one cavity with the exterior of the body member, the at least one cavity having a predetermined fixed volume, the predetermined distance being effective to permit the sample to enter the cavity by capillary force; and a reagent coated on the cavity surface.

4,088,449

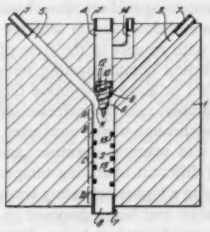
APPARATUS FOR FORMING SILICATE PRODUCTS

Fred Smith, Norwich, England, assignor to Anglian Water Authority, Huntingdon, England

Continuation-in-part of Ser. No. 624,816, Oct. 22, 1975, Pat. No. 4,016,097. This application Dec. 17, 1976, Ser. No. 751,863

Int. Cl.[2] B01J *13/00;* **B01F** *5/00*

U.S. Cl. 23—283 **8 Claims**



1. Apparatus suitable for use in the production of a suitable aqueous dispersion of a complex alkali metal-aluminium-sili-

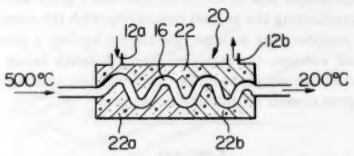
cate which is soluble in hydrochloric acid, the apparatus comprising a mixing tube, at least two inlets through which aqueous streams can pass into one end of the tube, one of the inlets being for the supply of the bulk of water for the process at a pressure of at least 40 psi, an outlet at the other end of the tube, and a stationary cone which fits in one inlet with its apex downstream and which defines an annular slot with the outer walls of that inlet, the apparatus further comprising means on or adjacent to the surface of the cone for causing helical flow of an annular sheet of liquid passing through the annular slot, in which apparatus the at least one other inlet is directed towards the surface of the cone, the apparatus further comprising a stationary shear helix fitted within the mixing tube, in which the shear helix comprises a series of baffles offset from one another along a helical path and each arranged at an angle such that it causes helical flow along the tube, the helical flow along the tube being reversed to the helical flow caused by the cone, the presence of the cone and the shear helix causing the aqueous streams to mix with one another with shear, and causing the product leaving the outlet to be at a pressure of atmospheric pressure or less and which is at least 40 psi below the pressure in the inlet of the bulk of the water.

4,088,450

HYDROGEN GENERATOR

Katuaki Kosaka, Hidaka; Zene Ueno, Fuchu; Seizo Ishikura, and Atushi Chida, both of Sayama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 7, 1976, Ser. No. 721,047
Claims priority, application Japan, Sep. 8, 1975, 50-108041
Int. Cl.[2] B01J *8/02;* C01B *1/13*
U.S. Cl. 23—288 L **3 Claims**



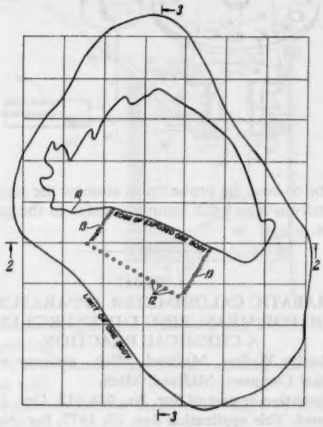
1. In a hydrogen generator for producing a hydrogen rich gaseous mixture by endothermic catalytic conversion of alcohol or aqueous solution thereof, including a conduit through which hot gases flow in one longitudinal direction, and a catalyst-containing reaction chamber extending axially along said conduit to be in heat-exchanging relationship therewith, the improvement comprising said reaction chamber having formed therein upstream and downstream sections which are successively arranged with respect to the flow of the heated gases, said upstream section communicating with an inlet through which said alcohol or aqueous solution thereof is supplied to said reaction chamber, said downstream section communicating with an outlet through which converted gaseous mixture is delivered from said reaction chamber, and first and second catalysts having different operating temperature ranges, said first catalyst having a higher operating temperature range than said second catalyst and being disposed in the upstream section, and said second catalyst being disposed in the downstream section thereby providing for optimum conversion as the hot gases give up heat to the endothermic reaction and lower in temperature as they pass through said conduit.

4,088,451

CONCENTRATION OF UNDERGROUND BRINES IN SITU BY SOLAR EVAPORATION

Abraham Sadan, P.O. Box 8471, Salt Lake City, Utah 84108

Continuation-in-part of Ser. No. 551,395, Feb. 20, 1975, Pat. No. 3,966,541. This application Mar. 2, 1976, Ser. No. 663,197
The portion of the term of this patent subsequent to Jun. 29, 1993, has been disclaimed.
Int. Cl. B01d *9/02;* C01d *1/30, 3/06*
U.S. Cl. 23—295 S **3 Claims**



1. A process for recovering a plurality of salts selected from the group consisting of carbonates, sulfates, borates and chlorides of sodium and potassium from natural underground Searles Lake brine comprising the steps of,

pumping said brine from the natural underground Searles Lake basin to above ground to accumulate a confined body of said brine exposed to solar evaporation in the Searles Lake region,

increasing the concentration of said salts of said confined brine by subjecting said brine to solar evaporation,

returning the brine of increased concentration to said natural underground basin,

continuing pumping brine to above ground,

subjecting it to solar evaporation to effect crystallization of concentrated salts and returning said brine to said natural underground basin until a brine of predetermined concentration has been obtained,

and thereafter recovering salts from said brine of predetermined concentration.

4,088,452

PREFUEL COMPOSITION AND METHOD

Soo B. Lee, Seoul, South Korea, assignor to Ki Hyun Lee, Los Angeles, Calif.

Filed Jan. 30, 1976, Ser. No. 654,015
Int. Cl.[2] C10L *1/32*
U.S. Cl. 44—51 **5 Claims**

1. A method for producing a liquid prefuel composition which may be mixed with water and oil to form a uniform admixture as a fuel which comprises;

placing carbon, water and oil, having a specific gravity of less than one, into a heating zone having an opening to the atmosphere and forming a non-homogenous mixture composed of a liquid phase 10 percent to 50 percent by weight of water and, on top thereof, a liquid phase of 10 percent to 50 percent by weight oil with 10 percent to 50 percent, by weight carbon intermixed in both liquid phases;

heating said non-homogenous mixture to a temperature of from 50° to 100° C. to vaporize the water and bubble the water vapor through, and in intimate contact with, the oil;

discontinuing heating and adding from 20 percent to 60 percent, by weight, light oil to the remaining liquid in said non-homogenous mixture to form a homogenous mixture of the liquid oil and the liquid remaining in said non-homogenous mixture and separating said uniform mixture of liquids from the solid carbon;

burning said uniform mixture of liquids in the presence of oxygen and extinguishing same by removing the source of oxygen, and recovering the resulting prefuel liquid composition.

4,088,453

PRODUCTION OF SOLID FUEL-WATER SLURRIES

Harry C. Wiese, San Diego; Jerrold R. Denchfield, Diamond Beach, both of Calif.; John C. Ahlborn, deceased, late of Pomona, Calif., by Lloyd Keys Ahlborn, executor, Hollywood, Calif., assignors to Texaco Inc., New York, N.Y.

Filed Jun. 24, 1976, Ser. No. 699,407
Int. Cl.[2] C10L *1/32*
U.S. Cl. 44—51 **10 Claims**

1. A process for producing a solid fuel-water slurry of improved pumpability which comprises forming a solid fuel-water slurry also containing NH_4OH in an amount between about 0.1 to 5.0 wt. % based on the total weight of the slurry.

4,088,454

METHOD FOR PRODUCING A LIQUID FUEL COMPOSITION

Soo B. Lee, Seoul, South Korea, assignor to Ki Hyun Lee, Los Angeles, Calif.

Filed Oct. 26, 1976, Ser. No. 735,675
Int. Cl.[2] C10L *1/16, 1/18*
U.S. Cl. 44—51 **2 Claims**

1. A method for producing a liquid fuel composition which comprises:

(a) adding to a container, from 10% to 50% by weight, of a precursor fuel, 20% to 70%, by weight, of oil and from 10% to 50%, by weight, of water to form a prefuel homogeneous liquid admixture in said container, said precursor fuel being made by placing carbon, water and oil, the oil having a specific gravity of less than one, into a heating zone having an opening to the atmosphere and forming a non-homogeneous mixture composed of a liquid phase of water and, on top thereof, a liquid of oil with coke intermixed in both liquid phases;

heating said non-homogeneous mixture to a temperature of from 50° C. to 100° C. to vaporize the water and bubble the water vapor through, and in intimate contact with, the oil;

discontinuing heating and adding from 20% to 60%, by weight, light oil to the remaining liquid in said non-homogeneous mixture to form a homogeneous mixture of the liquid oil and the liquid remaining in said non-homogeneous mixture and separating said uniform mixture of liquids from the solid carbon;

burning said uniform mixture of liquids in the presence of oxygen and extinguishing same by removing the source of oxygen, said burning and extinguishing steps being conducted between 1 and ten times and each burning step being conducted from about one-tenth of a minute to 2 minutes, and receiving the resulting liquid precursor fuel;

(b) adding to an alkali and oxidation resistant tank from 85% to 60%, by volume, of an aqueous solution of potassium hydroxide, or sodium hydroxide, or sodium bicarbonate, or mixtures thereof, said aqueous solution having a hydrometer reading, in degrees baume, of from 20 to 30 at 20°/4° C., and also adding from 40% to 15%, by weight, of lower alkyl alcohol, said aqueous solution and lower alkyl alcohol being added to said alkali and oxidation resistant tank in an amount such that, from 40% to 80% of the volume of the tank is filled with said lower alkyl alcohol and aqueous solution;

(c) transferring said prefuel homogeneous liquid admixture from said container to said tank so that said prefuel homogeneous liquid admixture mixes with said lower alkyl alcohol and aqueous solution, and continuing to add said prefuel homogeneous liquid admixture to said tank until the top of the tank overflows, said prefuel homogeneous liquid admixture being added to said tank at a rate which requires at least 1 hour to fill said tank, the amount of prefuel homogeneous liquid admixture being added at said rate being not in excess of twice the volume of said tank; and

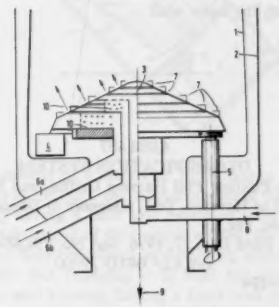
(d) recovering the thus obtained liquid fuel composition which has overflowed from the top of said tank.

4,088,455

PROCESS AND APPARATUS FOR A PRESSURE GASIFICATION OF FUELS MAINLY IN LUMP FORM

Rudolf Kohlen, Wehrheim; Gerhard Baron, Hofheim; Herbert Bierbach, and Carl Hafke, both of Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 22, 1977, Ser. No. 771,122
Claims priority, application Germany, Feb. 27, 1976, 2607964
Int. Cl.[2] C10J *3/16*
U.S. Cl. 48—202 **6 Claims**



1. In the continuous gasification of a fuel which is mainly in lump form comprising establishing a fixed bed of the fuel on a substantially conical rotary grate rotatably mounted in the lower portion of a shaft of a water-cooled reactor housing, subjecting the fuel at superatmospheric pressure to treatment with a gasifying agent containing free oxygen and at least one of water vapor and carbon dioxide, discharging the gasifying agent from said grate into said shaft, and removing gasification residue from the shaft, the improvement which comprises supplying gasifying agent to the central region of the grate and the shaft through a first conduit, and supplying gasifying agent to the outer region of the grate and the shaft through a second conduit, said outer region surrounding said central region and the free oxygen concentration in said outer region being higher than in said central region.

4,088,456

VACUUM PUMPING SYSTEM AND METHOD OF USE

Tiziano A. Giorgi, and Paolo della Porta, both of Milan, Italy, assignors to S.A.E.S. Getters S.p.A., Milan, Italy

Filed Jan. 7, 1975, Ser. No. 539,103
Claims priority, application Italy, Jan. 7, 1974, 19143 A/74
Int. Cl.[2] B01D *53/04*
U.S. Cl. 55—179 **14 Claims**

1. Means for connecting a vacuum pump to a chamber to be evacuated, said means comprising:

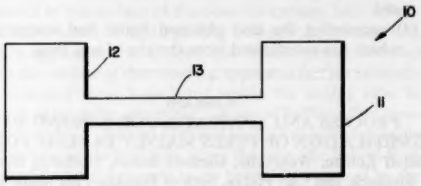
(a) an outer wall of low gas permeability,

(b) a gas sorptive means for sorbing gas, the gas sorptive means being substantially co-extensive with an inner sur-

face of the outer wall and removable with respect to the outer wall, the gas sorptive means comprising:

(i) a support means comprising a porous network defining a multiplicity of interconnecting free cells and

(ii) a gas sorptive material comprising the said supporting porous network of interconnecting free cells at least partially filled with non-evaporable, partially sintered getter powder, the getter powder consisting essentially



of a metal or an alloy of a metal selected from the group or Zr, Ti, Ta, Nb, and V, and having a sorptive capacity for oxygen, hydrogen, carbon monoxide and water vapor and a vapor pressure of less then 10^{-5} torr at 1000° C, and

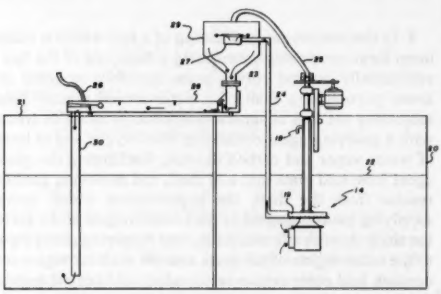
(c) a heating means for heating the gas sorptive means, the heating means located outside of but in thermal relationship with the outer wall.

4,088,457

DEGASIFICATION SYSTEM

Victor Quin Phillips; Phil Harmon Griffin, and Martin James Sharki, all of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 27, 1976, Ser. No. 754,854
Int. Cl.² B01D *19/00*
U.S. Cl. 55—194 **10 Claims**



1. A system for degasifying drilling fluids from a drilled borehole, said system comprising:

pump means arranged to pump drilling fluid and having intake and discharge port means;

spray vessel means connected fluidically to said discharge port means;

said spray vessel means having an enclosed vessel with an intake conduit, a spray assembly, a deflector

plate therein, vacuum creating means in said spray assembly, and a discharge opening;

a degasser vessel in a position lower than said spray vessel means and in fluid communication with said discharge opening; and,

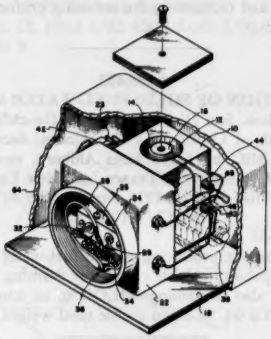
said degasser vessel being substantially enclosed and airtight, with a gas discharge port and a fluid discharge port.

4,088,458

HEATER BLOCK FOR LOW COST GAS CHROMATOGRAPH

Paul I. Jourdan, Houston, Tex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 2, 1977, Ser. No. 764,769
Int. Cl.² B01D *15/08*
U.S. Cl. 55—197 **4 Claims**



1. In a gas chromatograph, an assembly comprising:

(a) a solid heat conducting block;

(b) a first cavity in said block housing a chromatographic column;

(c) a second cavity in said block extending into close proximity to said first cavity and housing a temperature sensing element which can transmit an electrical signal whose magnitude is a function of the sensed temperature; and

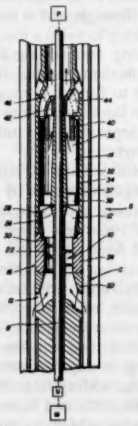
(d) a third cavity extending into close proximity of said second cavity and housing an electrically controllable heating element.

4,088,459

SEPARATOR

John Janos Tuzson, Evanston, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 20, 1976, Ser. No. 752,499
Int. Cl.² B01D *53/24*
U.S. Cl. 55—203 **12 Claims**



1. A separator assembly for separating fluids of different densities from a mixture thereof comprising:

an inducer, an impeller and a centrifugal separator means;

said inducer, impeller and separator means being arranged in series sequence;

a housing for said assembly having an inlet for fluid to said inducer and first and second outlets from said separator means for separated fluid;

means for actuating said inducer, said impeller and said separator means;

said inducer delivering fluid from said inlet to said impeller;

said impeller delivering fluid from said inducer to said separator means and imparting rotary motion thereof;

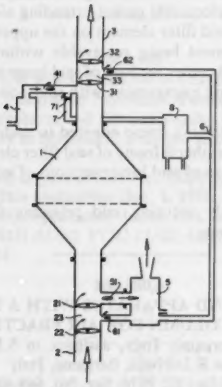
said centrifugal separator means comprising rotatable inner and outer cylindrical members and at least one longitudinal vane joining said inner and outer cylindrical members for centrifuging said fluid delivered from said impeller to separate the fluid into different density components which flow to and from said outlets.

4,088,460

PURIFYING AN AIR OR GAS STREAM CONTAINING COMBUSTIBLE VAPOROUS OR GASEOUS IMPURITIES

Karl Winter, Dortmund-Solde, Germany, assignor to Ceagfilter und Entstaubungstechnik GmbH, Dortmund, Germany

Filed Nov. 3, 1976, Ser. No. 738,569
Claims priority, application Germany, Nov. 5, 1975, 2549522
Int. Cl.[2] B01D *53/04*
U.S. Cl. 55—208 **2 Claims**



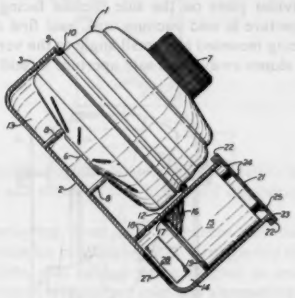
1. In apparatus for purifying an air or gas flow of combustible vaporous or gaseous impurities comprising an adsorption chamber, an adsorption filter disposed in said adsorption chamber, inlet means in said adsorption chamber for the introduction of an air or gas flow of combustible vaporous or gaseous impurities for passage to one side of said filter permitting said air or gas to pass therethrough and charge said filter to a predetermined level, outlet means in said adsorption chamber for the discharge of said air or gas passing through said filter and leaving the side of the filter opposite the side of introduction of said air or gas, a first gas inlet closing member on the inlet side for introduction of said air or gas containing impurities and a second gas outlet closing member on the discharge side of said air or gas for blocking the flow of said air or gas, a first burning chamber outside said adsorption chamber for generating an inert gas, connecting means for introducing said inert gas into said adsorption chamber at a point between said gas outlet closing member and said opposite side of the filter, thereby passing said inert gas through said filter in a direction of flow opposite that of said air or gas to desorb said filter and a third inert gas flow closing member to block the flow of said inert gas, the combination therewith of a protective gas generator outside said adsorption chamber for generating protective gas, connecting means for introducing said protective gas into said adsorption chamber at a point between said third inert gas flow closing member and said opposite side of the filter, and a fourth protective gas closing member to block the flow of said protective gas, and wherein said first gas inlet closing member is equipped with two spaced closing elements including connecting means for introducing said protective gas into the interspace between said two spaced gas inlet closing elements, and a fifth protective gas closing member to block the flow of said protective gas into said interspace.

4,088,461

COMBINATION OF A SUPPLEMENTARY FILTER AND RESPIRATOR FILTER

Lothar W. Brauer, Berlin, Germany, assignor to Auergesellschaft GmbH, Berlin, Germany

Filed Jul. 12, 1976, Ser. No. 704,379
Int. Cl.[2] B01D *50/00*
U.S. Cl. 55—275 **8 Claims**



1. A combination of a respirator filter having a front end provided with an air inlet, and a supplementary filter comprising a housing having a back side provided with an opening receiving said front end of the respirator filter, the wall of said supplementary filter containing said opening surrounding said respirator filter and engaging it to hold the supplementary filter thereon, said housing having a front wall opposite said respirator filter receiving opening and also having a portion extending laterally away from one side of said opening and rearwardly from said front wall beside the respirator filter, a perforated partition wall inside said housing between said lateral portion and said respirator filter receiving opening to separate the housing into first and second chambers, said second chamber being in said laterally extending portion of the housing and having an outer side wall and outer front and rear walls one of said outer walls of said second chamber being perforated for admission of air, and a removable filter member in said second chamber in the path of air flowing through that chamber from said perforated outer wall to said perforated partition wall and into said first chamber.

4,088,462

HOT-WATER EXTRACTION UNIT

Thomas M. Laule, Sparks, and R. Eugene Blackman, Reno, both of Nev., assignors to Parise & Sons, Inc., Reno, Nev.

Filed May 27, 1976, Ser. No. 690,821
Int. Cl.[2] B01D *45/08*
U.S. Cl. 55—437 **13 Claims**

1. In a combination vacuum and hot liquid cleaner comprising:

(a) a body;

(b) a vacuum tank mounted in said body;

(c) a hollow riser pipe mounted on the bottom of said between the interior of said hollow riser pipe and the interior of said vacuum tank;

(d) first means for creating a vacuum in said hollow riser pipe;

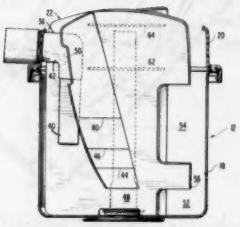
(e) an aperture in said vacuum tank near the top thereof for

communicating vacuum therefrom to the exterior of said vacuum tank; and

(f) a deflector divider mounted in said vacuum tank between said aperture and said riser pipe, said deflector divider comprising:

(i) a divider plate extending generally parallel to said riser pipe and adjacent thereto and being in height approximately equal to the interior height of said vacuum tank, and in width, approximately equal to the distance from one inner wall of said vacuum tank to the opposite wall taken along a line passing adjacent to the exterior of said riser pipe on the side thereof facing towards said aperture, and having at least one aperture therein near the bottom thereof, whereby said divider plate substantially inhibits but does not prevent passage of foreign matter from one side to the other of said divider plate, and

(ii) a first deflector plate attached to said divider plate approximately perpendicularly to the surface of said divider plate on the side thereof facing towards said aperture in said vacuum tank, said first deflector plate being mounted at a small angle to the vertical such that it slopes away from said aperture in said vacuum tank,



said first deflector plate being in width approximately equal to the distance from said divider plate to the adjoining wall of said vacuum tank and extending from approximately the top of said divider plate to a short distance above the bottom of said divider plate, whereby foreign matter introduced into said vacuum tank through said aperture in said vacuum tank is deflected to a segment of the bottom volume of said vacuum tank defined by the adjoining faces of said divider plate and said first deflector plate,

the improvement wherein said deflector divider further comprises a second deflector plate attached to said divider plate approximately perpendicularly to the surface of said divider plate on the side thereof facing away from said aperture in said vacuum tank and on the side of said riser pipe remote from said aperture in said vacuum tank, said second deflector plate extending from approximately the top of said divider plate to approximately the bottom thereof and from said divider plate past said riser pipe, but not extending to the opposite wall of said vacuum tank, whereby said second deflector plate inhibits but does not prevent passage of foreign matter from one side to the other of said second deflector plate.

4,088,463

FILTRATION MODULE

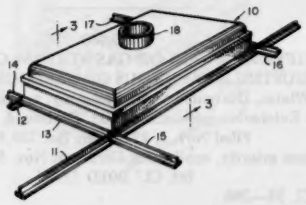
Irwin M. Smith, Grand Rapids, Mich., assignor to Frederick L. Fichter, Grand Rapids, Mich.

Filed May 5, 1976, Ser. No. 683,292
Int. Cl.[2] B01D *46/00*
U.S. Cl. 55—480 **2 Claims**

1. A filtration module for use in a ceiling grid of a clean room, comprising:

a housing of rectangular horizontal cross-section having a top with an opening therethrough for connection to an air supply and vertically extending side walls each terminating at its lower end in a continuous, inwardly directed horizontal flange adapted to be supported on said ceiling grid;

an inner wall adjacent each of said side walls, each said inner wall having an upper, center and lower section, said center section extending in spaced, parallel relation to the corresponding vertical side wall, said lower section having an outwardly stepped portion terminating in an outwardly directed horizontal flange overlying and secured to said horizontal flange of said corresponding side wall, and said upper section terminating in a downwardly projecting flange spaced inwardly from said center section, said housing and said inner walls together comprising an air-tight enclosure between said opening in said top and the opening defined by said downwardly projecting flanges;



a removeable filter element having a rectangular peripheral frame and a deformable gasket extending along the entire periphery of said filter element on the upper face thereof, said filter element being receivable within the opening defined by said center sections of said inner walls with said gasket in sealing engagement with said downwardly projecting flange;

a rectangular retaining frame adapted to underly the lower face of said peripheral frame of said filter element and said stepped portions of said lower sections of said inner walls; and

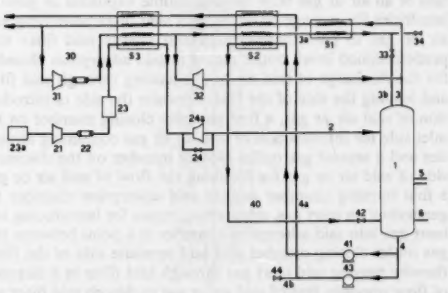
means releaseably securing said retaining frame to said stepped portions.

4,088,464

METHOD AND APPARATUS WITH A SINGLE RECTIFYING COLUMN FOR AIR FRACTIONATION

Emanuele Bigi, Bergamo, Italy, assignor to S.I.A.D. Societa Italiana Acetilene E Derivati, Bergamo, Italy

Filed Mar. 22, 1976, Ser. No. 669,421
Claims priority, application Italy, Mar. 26, 1975, 21662 A/75
Int. Cl.[2] F25J *3/04*
U.S. Cl. 62—22 **15 Claims**



1. A method for recovering oxygen, nitrogen and argon from air by means of a single rectification column, comprising:

(a) compressing atmospheric air,

(b) purifying the air,

(c) drying the air,

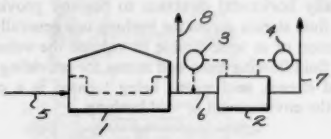
(d) cooling the air by countercurrent heat exchange with returning recovered nitrogen from the column in a first heat exchanger,
(e) feeding the cooler air to the upper half of the column,
(f) withdrawing cooled nitrogen gas from the top of said column,
(g) withdrawing liquid oxygen from the bottom of said column,
(h) withdrawing an argon stream intermediate said column,
(i) externally of the column liquefying a fraction of the withdrawn nitrogen gas by countercurrent heat exchange with a fraction of the withdrawn liquid oxygen, the liquid oxygen becoming gaseous, the liquefaction being achieved by:
(1) passing the liquid oxygen fraction countercurrent to a fraction of the returning recovered nitrogen in a second heat exchanger, the withdrawn nitrogen gas from the column passing through the second heat exchanger concurrently with the liquid oxygen fraction, and
(2) passing the withdrawn nitrogen gas initially through a third heat exchanger countercurrently to the returning recovered nitrogen, the returning recovered nitrogen becoming liquefied,
(j) recycling the liquefied nitrogen gas to the top of the column as a reflex nitrogen, and
(k) recycling the gaseous oxygen to the lower portion of the column.

4,088,465

PROCESS FOR RECOVERING A COMBUSTIBLE GAS

Kazumi Uda, Fukuyama; Motohiko Tamura, Mihara; Ichiro Nishiura, Takehara, and Hiroshi Fujiike, Mihara, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 732,075, Oct. 13, 1976, abandoned. This application Dec. 1, 1976, Ser. No. 746,625
Claims priority, application Japan, Oct. 20, 1975, 50-126105
Int. Cl.[2] B01D *53/30;* **F17C** *13/02;* **G01N** *25/54, 33/22*
U.S. Cl. 62—54 **10 Claims**



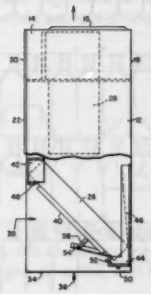
1. In a process for recovering a combustible gas in a gas recovering apparatus from a gaseous mixture comprising a combustible gas and a combustion-supporting gas, said gaseous mixture having a known explosion range upper limit and a known detonation range upper limit, the improvement comprising:
measuring an initial combustible gas content of said gaseous mixture before said gaseous mixture enters said gas recovering apparatus,
permitting only gaseous mixtures having a combustible gas content above the explosion range upper limit to enter the gas recovery apparatus,
recovering combustible gas from said gaseous mixture to reduce the combustible gas content of said gaseous mixture below the explosion range upper limit but above said detonation range upper limit,
measuring a final combustible gas content of said gaseous mixture as said gaseous mixture leaves said gas recovering apparatus, and
maintaining said combustible gas content in said gas recovery apparatus above said detonation range upper limit.

4,088,466

MULTI-POSITION AIR CONDITIONING UNIT

Joseph R. Humphrey, Avon Lake; Mickey F. Hickey, Grafton Township, Lorain County, and Ronald J. Nemeth, Elyria, all of Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 30, 1976, Ser. No. 728,485
Int. Cl.[2] F25D *21/14;* **F25B** *27/00*
U.S. Cl. 62—286 **3 Claims**



1. An air conditioning unit adapted for installation in a vertical disposition and either of two horizontal dispositions comprising:
a cabinet including front and rear faces and containing blower means for creating air flow through said cabinet in one direction, said cabinet being adapted to receive air therein through a front face inlet and alternatively an end inlet, said cabinet front face having access panel means separable from said cabinet;
a fin and tube evaporator coil angularly disposed in said cabinet with its upstream face presented to both said front face inlet and said end inlet areas;
a first condensate drain trough encompassing that end of said coil adjacent the front wall;
a second condensate drain trough encompassing that end of said coil adjacent said rear wall;
a drain pan of relatively large area extending along the rear wall of said cabinet and facing the downstream face of said coil and inclined relative to the rear wall fo feed condensate into said second drain trough;
a detachable drip tray of relatively small area compared to said drain pan and facing the upstream face of said coil, and adapted to be positioned to feed condensate to said first drain trough in one horizontal position of said unit, and to feed condensate to said second drain trough in a vertical disposition of said unit.

4,088,467

PROCESS FOR SPINNING GLASS FIBERS

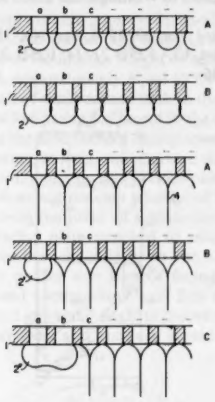
Hiroaki Shono; Isao Wakasa; Toshiaki Kikuchi, and Toshio Noji, all of Fukushima, Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan

Continuation-in-part of Ser. No. 656,880, Feb. 10, 1976, abandoned. This application May 23, 1977, Ser. No. 799,855
Int. Cl.[2] C03B *37/02*
U.S. Cl. 65—2 **3 Claims**

1. In a process for starting up a method for the continuous spinning of glass fibers downwardly from a nozzle plate having a plurality of orifices by drawing an individual filament from each orifice, said plurality of orifices being in a horizontal nozzle place attached to a lower surface of a melting furnace the improvement which consists essentially of the steps of
using a nozzle plate made of a material having a contact angle of 60° or more to molten glass and containing 25 – 200 orifices per cm^2 so that molten glass effluent from the orifices may form combined beads,

forming combined molten glass beads spread over the under surface of the nozzle plate,

drawing the combined molten glass beads spread over the under surface of the nozzle plate at a greater speed than



the effluent speed of the molten glass from each orifice so as to separate the molten glass into an individual filament from each orifice, while maintaining the normal spinning temperature,

and finding the ends of the individual filaments.

4,088,468

METHOD AND APPARATUS FOR APPLYING SIZE TO GLASS STRANDS

Cletis L. Roberson, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Dec. 16, 1976, Ser. No. 751,785
Int. Cl.² C03B *37/02*
U.S. Cl. 65—3 R **6 Claims**

1. Apparatus for applying a coating to a filament having a liquid on the surface thereof comprising:

(a) a walled member, the wall of said member having an aperture communicating through the wall of said member;

(b) a liquid-absorbing material, adapted for contact with said filament, and positioned in contact with said aperture; and,

(c) means providing a suction to the interior of said walled member to aid in removal of said liquid from from said filament,

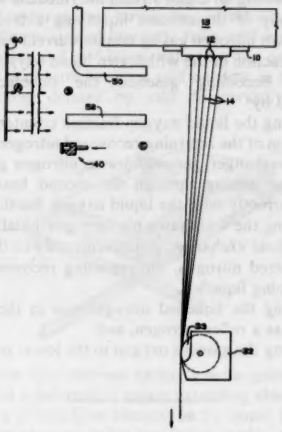
(d) means for applying a coating to said filament upon disengagement from said contact with said liquid-absorbing material.

4,088,469

ENVIRONMENTAL CONTROL OF A GLASS FIBER FORMING BUSHING

William L. Schaefer, Gibsonia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 21, 1977, Ser. No. 779,443
Int. Cl.² C03B *37/02*
U.S. Cl. 65—5 **5 Claims**



1. In a method of forming continuous glass fibers comprising attenuating glass filaments through bushing tips in a bushing, gathering the filaments into a unified strand, collecting the strand and passing a stream of gaseous fluid across the bushing in a generally horizontal direction to control the environment in the fiber forming region below the bushing, the improvement comprising flowing a narrow, high velocity gaseous fluid stream from a means for providing said gaseous fluid stream in a generally horizontal path below the bushing, said velocity being sufficient to induce and entrain air from the region below the bushing into said high-velocity gaseous fluid stream and in a generally horizontal direction to thereby provide a total gaseous fluid stream across the bushing in a generally horizontal direction of at least double in volume the volume of the gaseous fluid flowing from said means for providing said gaseous fluid stream, said means being located in a position to control the environment of said bushing.

4,088,470

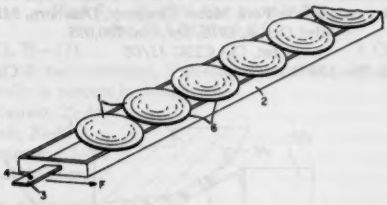
PROCESS OF HEAT SAGGING GLASS ARTICLES

André Bourg, Lewarde; Jean P. M. Hazart, Douai, and Jacques Y. Jouret, Aniche, all of France, assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 3, 1977, Ser. No. 773,958
Claims priority, application France, Mar. 18, 1976, 76 07905
Int. Cl.² C03B *23/02*
U.S. Cl. 65—105 **4 Claims**

1. A process for forming lenses for spectacles comprising, providing an alveolated mold having a plurality of juxtapositioned upwardly open concave surface portions with the uppermost edges of the concave surfaces being continuous circular edges providing raised linear support portions between said concave surfaces, positioning a sheet of glass upon said alveolated mold and supporting such sheet by said raised linear support portions, subjecting said sheet of glass to a thermal sagging cycle, uniformly sagging such sheet downwardly within the concave portions of said alveolated mold to form said sheet into a plurality of substantially spherical shapes with uniformly curved indentations in an upper surface of said sheet, discontinuing the thermal sagging cycle prior to there being contact between the sheet and the concave surface por-

tions, cooling the sagged sheet to form a glass preform with a plurality of interconnected curved indentations, and cutting



finished lenses from the uniformly curved indentations formed in said preform.

4,088,471

APPARATUS FOR COATING GLASS

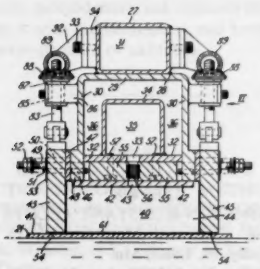
Bernard James Kirkbride, Wigan; Robert Andrew Downey, Burscough; Charles Victor Thomasson, Preston, and Joseph Earle Lewis, Burscough, all of England, assignors to Pilkington Brothers Limited, St. Helens, England

Division of Ser. No. 585,522, Jun. 10, 1975, Pat. No. 4,019,887. This application Dec. 13, 1976, Ser. No. 749,716

Claims priority, application United Kingdom, Jun. 14, 1974, 26522/74

Int. Cl.² C03C *17/00*

U.S. Cl. 65—182 R **6 Claims**



1. Apparatus for coating glass, comprising a gas distributor for locating transversely of the path of travel of a glass surface to be coated, said gas distributor including an elongated gas supply duct formed with an elongated aperture for supplying coating material in gaseous form, heat exchange means mounted in heat exchange relationship with the gas supply duct for controlling the temperature of the duct, an elongated open-faced chamber for positioning with its open face adjacent the path of travel of the glass surface, which chamber has side walls defining a gas flow channel leading to said open face from an elongated aperture for gas flow into said chamber which aperture extends along the length of the chamber, and gas-flow restrictor means connecting the elongated aperture in said gas supply duct to the elongated aperture for gas flow into the chamber to ensure gas release from the gas supply duct into the chamber at a substantially constant pressure along the length of the chamber.

4,088,472

AGRICULTURAL PROCEDURE

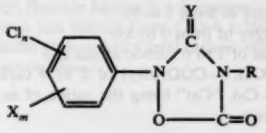
Paul J. Stoffel, St. Louis, and Ignatius Schumacher, Webster Groves, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 13, 1965, Ser. No. 513,577

Int. Cl.² A01N *9/22*

U.S. Cl. 71—92 **12 Claims**

1. A method of controlling the growth of vegetation which comprises contacting said vegetation or the vegetation growth medium with a phytotoxic amount of a compound of the formula



wherein X is alkyl of up to 4 carbon atoms, alkoxy of up to 4 carbon atoms or nitro, *n* is an integer from zero to three, *m* is zero or one, Y is oxygen or sulfur, and R is alkyl of up to 4 carbon atoms.

4,088,473

HERBICIDAL COMPOSITION FOR WEED CONTROL

Thomas Harry Linton, 48 Farmcrest Dr., Agincourt, Ontario, Canada

Continuation-in-part of Ser. No. 548,947, Feb. 11, 1975, abandoned, which is a division of Ser. No. 440,940, Feb. 8, 1974, Pat. No. 3,925,927. This application Apr. 20, 1977, Ser. No. 789,048

Claims priority, application Canada, Feb. 7, 1974, 191984

Int. Cl.² A01N *9/22, 9/24*

U.S. Cl. 71—92 **8 Claims**

1. A solid herbicidal composition useable for controlling plant growth comprising

75 to 89% by volume of synthetic wax, said synthetic wax containing no natural wax and becoming molten when heated to a temperature over about 200° F., and being chosen from the group consisting of N,N'-ethylene bis-stearamide and synthetic microcrystalline wax,

5 to 10% by volume of synthetic plasticizer, said synthetic plasticizer being chosen from the group consisting of phthalates and sebacate esters, and

6 to 15% by volume of herbicide material, said herbicide material comprising

2 to 5% by volume of 2(-4-chloro-2-methylphenoxy) propionic acid,

2 to 5% by volume of 2-methoxy-3,6-dichlorobenzoic acid, and

2 to 5% by volume of 2-methyl-4-chlorophenoxyacetic acid.

3. A solid herbicidal composition according to claim **1** including a growth inhibiting material chosen from the group consisting of 2,2-dichloropropionic acid and 6,7-dihydrodipyrido [1,2-*a*:2',1'-*c*] pyrazinediium ion (9,10-dihydro-8*a*,10*a*-diazoniaphenanthrene-2A).

4,088,474

HERBICIDAL AGENTS

Karl Matterstock, Hofheim, Taunus; Peter Langeluddeke, Didenbergen, Taunus, and Ernst-Friedrich Schulze, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

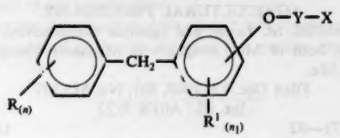
Filed Apr. 8, 1975, Ser. No. 566,536

Claims priority, application Germany, Apr. 10, 1974, 2417487

Int. Cl.² C07C *9/76;* A01N *9/24;* C07C *65/00*

U.S. Cl. 71—108 **11 Claims**

1. A benzyl-phenoxyalkanecarboxylic acid or derivative thereof corresponding to the formula



wherein

R is halogen or alkyl, haloalkyl, alkoxy or haloalkoxy of 1 to 4 carbon atoms;

R′ is alkyl of 1 to 4 carbon atoms or halogen;

n is an integer of from 1 to 3;

n_1 is an integer of from 0 to 3;

Y is alkylene of 1 to 6 carbon atoms and

X is —COOH, —COO alkyl of 2 to 9 carbon atoms or —COO—Cat, "Cat" being the cation of an inorganic or organic base.

4,088,475

ADDITION OF REACTIVE ELEMENTS IN POWDER WIRE FORM TO COPPER BASE ALLOYS

Derek E. Tyler, Cheshire, Conn.; David W. Dickinson, Hinckley, Ohio; James E. Dore, Ballwin, Mo., and Abid A. Khan, Hamden, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Nov. 4, 1976, Ser. No. 738,821

Int. Cl.[2] C22B *15/00*; C22C *1/00*

U.S. Cl. 75—76 **7 Claims**

1. A method for adding reactive elements to a molten metal mass consisting essentially of the following steps:

(a) providing a reactive element powder or a mixture of reactive elements in powder form wherein said reactive element is selected from the group consisting of chromium, titanium, vanadium, zirconium, magnesium, boron, beryllium, strontium, yttrium, cerium, niobium and mixtures thereof, said reactive element or mixture being mixed with copper powder or copper base alloy powder;

(b) providing a molten mass of metal selected from the group consisting of copper and copper base alloys which are compatible with both said reactive elements and said copper powder or copper base alloy powder;

(c) placing the powder mixture into tubing formed from metal compatible with said molten mass of metal and said powder mixture and sealing the ends of said tubing; and

(d) adding the tubing filled with said powder mixture to said molten metal mass to enable dissolution and uniform distribution of said reactive elements and copper or copper base alloy throughout the entire molten metal mass.

4,088,476

ABRASION-RESISTANT CAST IRONS

Tsutomu Takao, Tokyo, and Kentaro Takahashi, Ohmiya, both of Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed Oct. 29, 1976, Ser. No. 737,131

Claims priority, application Japan, Oct. 29, 1975, 50-130130

Int. Cl.[2] C22C *37/04*

U.S. Cl. 75—123 CB **1 Claim**

1. An abrasion-resistant cast iron selected from the group consisting of gray iron and mottled iron consisting of 2 to 15%, as an area ratio, of a boron carbide, 2 to 7%, as an area ratio of graphite and the balance consisting essentially of pearlite.

4,088,477

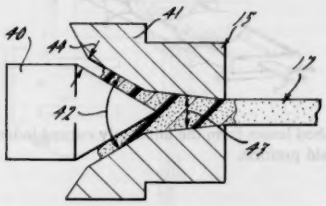
SHEATHLESS WIRE FEEDING OF ALLOY AND INOCULANT MATERIALS

Adolf Hetke, Livonia, and Walter J. Evans, Ann Arbor, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 6, 1976, Ser. No. 730,095

Int. Cl.[2] C22C *33/08*

U.S. Cl. 75—130 R **7 Claims**



1. A method for treating molten metal with a reaction agent, comprising:

(a) preparing and defining a continuous strand consisting of a uniform mixture of one or more reactive agents in particulate form and a solid flexible binder vaporizable upon contact with said molten metal, said strand being sheathless, and tubular in shape and having a cross-sectional diameter of 0.187–0.250 inches unvarying more than ±.5%, said binder being less than 20% of said strand,

(b) form an exposed stream of said molten metal having a controlled and substantially uniform flow rate through said stream selected from the range of 15–40 lbs./sec., and

(c) progressively injecting said strand transversely into said stream at a rate to provide a predetermined reaction between said agent and molten metal, said strand being subjected substantially ambient pressure and temperature conditions up to the instant and point of injection into said molten stream.

4,088,478

CORROSION-RESISTANT ALLOYS

John H. Culling, Kirkwood, Mo., assignor to Carondelet Foundry Company, St. Louis, Mo.

Continuation of Ser. No. 463,886, Apr. 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 346,693, Mar. 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 137,641, Apr. 26, 1971, abandoned. This application Dec. 16, 1976, Ser. No. 751,039

Int. Cl.[2] C22C *30/02*

U.S. Cl. 75—134 C **4 Claims**

1. An air-meltable castable alloy, resistant to corrosion by sulfuric acid over a wide range of acid strengths, consisting essentially of between about 34.10 and about 39.33% by weight nickel, between about 12.50 and about 14.29% by weight chromium, between about 5.90 and about 17.89% by weight molybdenum, between about 2.90 and about 5.67% by weight copper, between about 0.10 and about 1.25% by weight silicon, between about 0.003 and about 0.15% by weight carbon, between about 22 and about 29% by weight iron, up to about 3.0% by weight manganese, up to about 9.80% by weight tungsten, up to about 4.68% by weight tantalum, and up to about 3.00% by weight niobium.

4,088,479

HOT CORROSION RESISTANT FABRICABLE ALLOY

Charles J. Spengler, Franklin Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 16, 1976, Ser. No. 649,773
Int. Cl.[2] C22C *19/05*
U.S. Cl. 75—171 6 Claims

1. A corrosion-resistant, high-temperature alloy consisting essentially in percent by weight of:

chromium; 25–45
cobalt; 20–40
aluminum; 2.5–5.5
nickel; balance,

the said alloy having high fabricability enabling said alloy to be formed into thin sheets and wire.

4,088,480

PROCESS FOR PREPARING REFRACTORY METAL-SILVER-CADMIUM ALLOYS

Han J. Kim, Chelmsford; F. Joseph Reid, Acton, and Frederick J. Scimeca, Milford, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Sep. 10, 1976, Ser. No. 722,856
Int. Cl.[2] B22F *3/26*
U.S. Cl. 75—200 11 Claims

1. A process for preparing a composite of a refractory material, silver, and cadmium which comprises infiltrating cadmium metal into a compact of a refractory material and silver wherein the refractory material is selected from the group consisting of tungsten, tungsten carbide, molybdenum, and mixtures thereof using an over-pressure of cadmium at an elevated temperature.

9. A process for preparing a composite of a refractory material, silver, and cadmium which comprises providing a compact of a refractory material and silver wherein the refractory material is selected from the group consisting of tungsten, tungsten carbide, molybdenum, and mixtures thereof, contacting said compact with cadmium metal, and heating the assembly using an over-pressure of cadmium.

4,088,481

EXTENDED RANGE COLOR ELECTROPHOTOGRAPHIC METHOD BY SUPERIMPOSING A HALF-TONE IMAGE ON A LOW DENSITY CONTINUOUS TONE IMAGE

Karl B. Ayash, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 513,685, Oct. 10, 1974. This application Jan. 8, 1976, Ser. No. 647,468
Int. Cl.[2] G03G *13/14*
U.S. Cl. 96—1.4 8 Claims

1. A method of reproducing an original document on a sheet of support material, including the steps of:

forming a first powder image having a lower density than the original document on a photoconductive member;

transferring the first powder image from the photoconductive member to a sheet of support material;

producing a half-tone powder image having substantially the density of the original document on the photoconductive member; and

transferring the half-tone powder image from the photoconductive member to the sheet of support material in superimposed registration with the first mentioned powder image transferred thereto to produce a copy of the original document therein.

4,088,482

ORGANIC PHOTOCONDUCTING COMPOSITIONS CONTAINING AROMATIC SULFONYL FLUORIDES AND THEIR USE IN ELECTROPHOTOGRAPHIC PROCESSES

Ralph G. Czerepinski, Holliston; Jeffrey K. Hecht, Framingham, both of Mass., and Thomas T. Chiu, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 13, 1971, Ser. No. 162,307
Int. Cl.[2] G03G *5/09*
U.S. Cl. 96—1.5 R 20 Claims

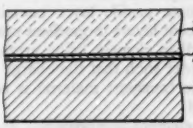
1. An organic photoconductor in admixture with an activating amount of at least one aromatic sulfonyl fluoride, said aromatic sulfonyl fluoride having a polynuclear aromatic hydrocarbon nucleus and having from 1 to 4 sulfonyl fluoride groups per aromatic nucleus and a total carbon content of from 6 to about 30 carbon atoms.

4,088,483

ELECTROPHOTOGRAPHIC PLATE WITH CHARGE TRANSPORT OVERLAYER

Yoshihiro Isono, Itami, and Masataka Oda, Toyonaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Feb. 4, 1975, Ser. No. 547,086
Claims priority, application Japan, Feb. 13, 1974, 49-17419
Int. Cl.[2] G03Q *5/082*
U.S. Cl. 96—1.5 R 6 Claims

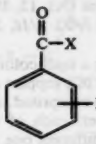


1. An electrophotographic sensitive member for forming an electrostatic latent image which comprises in the following order:

(a) an electrically conductive base,

(b) a photoconductive layer including at least selenium disposed on said base and having a thickness in the range of about 0.1 to 1 micron, said layer generating charge carriers therein upon absorption of visible light,

(c) an organic semiconductive layer of polyvinylcarbazole having a thickness in the range of about 5 to 30 microns, disposed over said photoconductive layer for retaining charges on the surface thereof and for transporting the charge carriers generated in said photoconductive layer, said organic semiconductive layer containing therein about 0.2 to 2 parts by weight of a nitrated benzoic acid derivative per 100 parts by weight of polyvinylcarbazole said derivative improving the repetitive characteristic of said sensitive member and having the following formula:



wherein X = OH or Cl and R represents 2 or 3 nitro radicals.

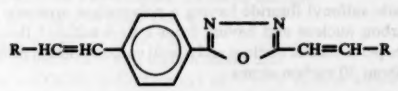
4,088,484

DERIVATIVES OF 1,3,4-OXADIAZOLE AND ELECTROPHOTOGRAPHIC ELEMENTS CONTAINING SAME

Mitsuo Okazaki, Tama; Akihiro Yamaguchi, Yokohama, and Masaomi Sasaki, Toyko, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1977, Ser. No. 784,618
Claims priority, application Japan, Apr. 12, 1976, 51-40373
Int. Cl.[2] G03G 5/04; C07D 413/14
U.S. Cl. 96—1.5 R **13 Claims**

1. A compound having the formula



wherein R is N-alkylcarbazolyl, said alkyl having from one to 4 carbon atoms.

4,088,485

GRADED BANDGAP XEROGRAPHIC PLATE

Samuel Wei Ing, Webster, and Fred William Schmidlin, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 422,931, Dec. 7, 1973, abandoned. This application Oct. 21, 1975, Ser. No. 624,361
Int. Cl.[2] G03G 5/082
U.S. Cl. 96—1.5 R **23 Claims**

1. A xerographic element comprising:
(a) a substrate;
(b) an intermediate element comprising:
a charge generating layer,
a charge transport layer, and
an intermediate profile layer containing material from both adjacent layers in gradient concentrations,
the intermediate element being arranged in indicated or inverse order such that the charge generating layer or the charge transport material is adjacent to the substrate; and
(c) an outside element comprising:
a profile layer, and
a trapping layer
the profile layer of said outside element containing:
(1) trapping material, and
(2) (a) charge transport material or
(b) charge generating material in gradient concentrations coinciding with the adjacent layer of said intermediate element, said generating material in each instance having a bandgap of about 0.3–1.9 electron volts and the corresponding trapping or transport layer material having a higher bandgap, in each instance, of no less than about 1.6 electron volts.

4,088,486

PROCESS OF BLEACHING SILVER IMAGES TO FORM DYE IMAGES USING COBALT COMPLEXES AND PEROXIDES

Vernon L. Bissonette, Brockport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 602,156, Aug. 6, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,284
Int. Cl.[2] G03C 7/00, 7/16, 5/32, 5/38
U.S. Cl. 96—22 **72 Claims**

55. A method of forming a multicolor dye image in a photographic element comprised of a support and, coated thereon, at least three layer units each comprised of at least one gelatino-silver halide emulsion layer, each of said layer units being primarily responsive to a different one of the blue, green and red portions of the visible spectrum, the blue-sensitive layer unit containing an open-chain ketomethylene yellow-dye-forming color coupler, the green-sensitive layer unit containing a 5-pyrazolone magenta-dye-forming color coupler and the red-sensitive layer unit containing a phenolic cyan-dye-forming color coupler, and at least one of the layer units containing a developable latent image, comprising sequentially

bringing th photographic element into contact with an aqueous alkaline developer solution having a pH in the range of from 10 to 13 wherein at least one of the photographic element and the developer solution contains at least one black-and-white silver halide developing agent, so that a silver image is formed in the photographic element corresponding to the developable latent image,

bringing the photographic element into contact with a separate aqueous alkaline bleach-fix solution having a pH in the range of from 10 to 13 which is substantially free of any compound which will form a tridentate or higher dentate ligand with cobalt and comprising an alkali or ammonium bromide or thiosulfate, and at least one of the photographic element and the aqueous alkaline bleach-fix solution comprising cobalt hexammine, so that at least a portion of the silver image is bleached, and

bringing the photographic element into contact with a separate aqueous alkaline amplification solution having a pH in the range of from 10 to 13 and containing hydrogen peroxide and a primary para-phenylenediamine color-developing agent, wherein the hydrogen peroxide and the primary para-phenylenediamine color developing agent are essentially inert to oxidation-reduction in the absence of a catalyst, to form a dye image in at least one of the three layer units with a dye image.

65. A method of forming a multicolor dye image in a photograhic element comprised of a support and, coated thereon, at least three layer units each comprised of at least one gelatino-silver halide emulsion layer, each of said layer units being primarily responsive to a different one of the blue, green and red portions of the visible spectrum, the blue-sensitive layer unit containing an open-chain ketomethylene yellow-dye-forming color coupler, the green-sensitive layer unit containing a 5-pyrazolone magenta-dye-forming color coupler and the red-sensitive layer unit containing a phenolic cyan-dye-forming color coupler, and each of said layer units containing a developable latent image, comprising developing the latent image to form a corresponding silver image, bleaching the silver image siver image, concurrently forming a catalyst image corresponding to the silverimage, fixing the silver halide, and forming a dye image corresponding to the original latent image in each layer unit, the improvement

wherein each of the developing, bleaching and dye image forming steps are performed by bringing the photographic element into contact with a monobath comprising an aqueous alkaline developer solution having a pH in the range of from 10 to 13 containing at least about 2 grams per liter of an alkali thiosulfate, 0.2 to 2 grams per liter of cobalt hexammine acetate or chloride, 0.001 to 0.5 mole per liter of hydrogen peroxide, and 1 to 20 grams per liter of a primary para-phenylenediamine color-developing agent.

4,088,487

DIFFUSION TRANSFER INTEGRAL FILM UNITS WITH FLARE REDUCING LAYERS

Stanley M. Bloom, Waban, and Howard G. Rogers, Weston, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 554,741, Mar. 3, 1975, abandoned. This application Jun. 16, 1977, Ser. No. 807,142
Int. Cl.[2] G03C 1/40, 7/00, 1/84, 5/54
U.S. Cl. 96—29 D **37 Claims**

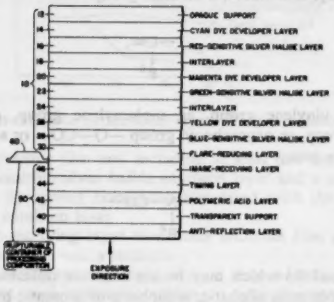
1. A photographic film unit adapted to be exposed and processed to produce a diffusion transfer image comprising, in combination:

a laminate including two support layers, at least one of which is transparent, and intermediate said support layers

a plurality of layers including an image-receiving layer and at least one photosensitive silver halide emulsion, said photosensitive silver halide emulsion(s) being photoexposable through said transparent support layer;

a rupturable container of processing composition coupled to said laminate in position to discharge said processing composition for spreading between a predetermined pair of layers of said laminate and thereby cause delamination of said laminate between said predetermined layers thereof;

said laminate including a flare-reducing layer containing a non-diffusible light-absorbing material, said flare-reducing layer being carried by the same support as said photosensitive silver halide emulsion(s), said flare-reducing layer being positioned between said photosensitive silver halide emulsion(s) and said transparent support through which



photoexposure of said photosensitive silver halide emulsion(s) is effected, said transparent support having a higher index of refraction than the binder material of said first silver halide layer;

said rupturable container being so positioned as to distribute its contents between said flare-reducing layer and said transparent support through which photoexposure is effected;

said film unit including means providing a light-reflecting layer of a white pigment between said flare-reducing layer and said image-receiving layer to provide a white background for said image-receiving layer and to mask the developed silver halide emulsion(s) and said flare-reducing layer, and means providing a diffusible image-forming material for transfer to said image-receiving layer, the support carrying said image-receiving layer being transparent.

4,088,488

PHOTOGRAPHIC ELEMENTS CONTAINING NITROXYL RADICAL OXIDANTS

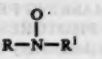
Jack C. Chang; Peter A. Marr, both of Webster, and Samuel J. Ciurca, Jr., Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 367,304, Jun. 5, 1973, abandoned. This application Nov. 25, 1975, Ser. No. 635,018

Int. Cl.² G03C *7/00, 5/54, 1/40, 1/48*

U.S. Cl. 96—29 D **9 Claims**

9. In a photographic process wherein an imagewise-exposed photographic silver halide emulsion is developed and wherein an oxichromic compound is oxidized to provide an image dye record, said oxichromic compound capable of undergoing chromogenic oxidation to form a photographic image dye, the improvement wherein said oxichromic compound is oxidized by a stable free nitroxyl radical, said radical being of the formula



wherein:

R and R^1, when taken separately, each represents (1) an alkyl group having no hydrogen on the α-carbon atom or (2) an aryl group substituted with an alkyl group of from 1–19 carbon atoms, an alkoxy group of from 1–19 carbon atoms or a nitro group and R and R^1, when taken together, represent the non-metallic atoms necessary to complete a 5-, 6-, or 7-membered heterocyclic nucleus having no hydrogen on carbon atoms adjacent the nitrogen atom of the formula.

4,088,489

METHOD FOR THE PREPARATION OF RELIEF STRUCTURES

Roland Rubner, Rottenbach u Forchheim; Wolfgang Kleeberg, and Eberhard Kühn, both of Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

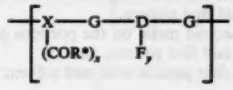
Filed Jul. 24, 1975, Ser. No. 598,828

Claims priority, application Germany, Aug. 2, 1974, 2437422

Int. Cl.² G03C *5/00*

U.S. Cl. 96—35.1 **4 Claims**

1. In a method for the preparation of relief structures consisting of highly heat resistant polymers comprising the steps of applying a soluble, photo or radiation-sensitive prepolymer in the form of a film or foil to a substrate, said prepolymer being a poly-addition or poly-condensation prepolymer having repeating units of the formula



wherein, X and D each comprise a carbocyclic and/or heterocyclic nucleus:

G is selected from the group consisting of amide, urea or urethane linkages;

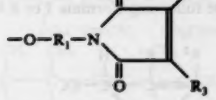
R* is an organic radical containing a photo- or radiation induced di- or polymerizable olefinic double bond; and is a component of group COR*, said group bound to said nucleus in ortho or peri-position to G;

F is a group capable of reacting with the carbonyl group of COR* to form a cyclic structure upon heating of the prepolymer to liberate R*OH; and wherein F is arranged in ortho- or peri-position to G;

x is 1 or 2; and

y is 0 or 2

exposing or irradiating the photo or radiation active layer through a negative pattern, dissolving or stripping the unexposed or unirradiated portions and annealing the relief structure obtained; the improvement which comprises using as said R*, a radical represented by the formula;



wherein R_1 is alkylene or aralkylene; R_2 is selected from the group consisting of hydrogen, methyl and chlorine, and R_3 is hydrogen.

4,088,490

SINGLE LEVEL MASKING PROCESS WITH TWO POSITIVE PHOTORESIST LAYERS

Peter James Duke, San Jose; Jerry Leff, Saratoga; Leo Calica Liclican, and Mark Vernon Powell, both of San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 14, 1976, Ser. No. 695,484
Int. Cl.[2] G03C 5/00
U.S. Cl. 96—36.2 7 Claims

1. A method for selectively metallizing a microelectronic device comprising the steps of

applying a first layer of a certain positive photoresist upon a conductivity clad substrate, said photoresist becoming more soluble upon exposure to actinic radiation,

exposing said first layer to actinic radiation through a first mask,

developing to remove the exposed portion of said first layer whereby a first pattern with critical dimensions is formed in said first layer,

baking said first pattern sufficiently to partially insolubilize said first pattern in said photoresist to cause said first pattern to be substantially insensitive to actinic radiation but later removable by a solvent,

applying a second layer of said certain photoresist to cover said first pattern and said substrate,

exposing said second layer and said first pattern to actinic radiation through a second mask, said second mask different from said first mask,

developing to remove the exposed portion of said second layer whereby a second pattern in said second layer is formed without affecting the dimensions of said first pattern,

depositing a first metal on the portions of said substrate exposed by both said first pattern and said second pattern,

exposing said second pattern to actinic radiation and then developing it for removing said second pattern without affecting said first pattern,

depositing a second metal on the portions of said substrate exposed in said first pattern, and

stripping said first pattern with said solvent.

4,088,491

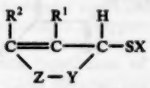
LIGHT SENSITIVE PHOTOGRAPHIC MATERIAL

Heinrich Odenwälder, Cologne; Walter Püschel, and Erwin Ranz, both of Leverkusen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 16, 1976, Ser. No. 742,139
Claims priority, application Germany, Nov. 22, 1975, 2552505
Int. Cl.[2] G03C 7/00, 5/30, 1/02
U.S. Cl. 96—55 7 Claims

1. A color photographic process for producing color images, which comprises imagewise exposing a light sensitive color photographic multi-layer material having at least one silver halide emulsion layer on a support and associated with that layer a non-diffusible DIR compound capable of reacting with the oxidation product of the color developer to release in imagewise distribution a diffusible mercapto compound which inhibits development of silver halide.

and color developing the imagewise exposed photographic material in the presence of the thioether DIR compound, and in the presence of a color coupler to form an image dye wherein the improvement comprises the color development is carried out in the presence of a thioether compound of the following Formula I or a tautomer thereof



I

in which

X represents an aliphatic, aromatic or heterocyclic group such that when it is split off together with the sulfur atom of the thioether bridge it forms a diffusible mercapto compound which inhibits development of silver halide;

Y represents —O—,

a methylene group which may be alkyl substituted or a methine group

Z represents a methylene or ethylene group which may be alkyl substituted, a methine group

a vinylene group, an o-phenylene group, a carbonyl group, an oxycarbonyl group —O—CO— or a carbonamide group

R^1 and R^2 which may be the same or different represent hydrogen, aliphatic, araliphatic or aromatic hydrocarbon groups, acyl, acyloxy, alkoxy, aryloxy, amino, halogen, cyano, thioether groups or alkylsulfoxyl or arylsulfoxyl, R^1 and R^2 together represent the group required to complete a ring having at least one double bond or aromatic ring,

R^4 represents hydrogen, alkyl having up to 22 carbon atoms, aralkyl, aryl or acyl,

R^5 and R^6 have each one of the meanings indicated for R^1 and R^2 or together represent the group required to complete a ring having at least one double bond or aromatic ring.

4,088,492

DIAZOTYPE MATERIALS WITH HYDROXYPROPYL CELLULOSE ETHER AS ANTI-SLIP MATERIAL

John Anthony Pope, Colchester, and Timothy Douglas Andrews, East Bergholt, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 1, 1973, Ser. No. 412,029
Claims priority, application United Kingdom, Nov. 3, 1972, 50691/72
Int. Cl.[2] G03C 1/60, 1/80
U.S. Cl. 96—75 5 Claims

1. A diazotype material which comprises a support film coated with a layer which includes a light sensitive diazonium compound and also

a. a resinous binder applied directly to the surface of the support film or to an underlying subbing layer, or

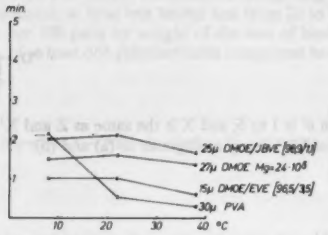
b. a receptive plastics material impregnated with said diazonium compound, wherein an anti-alip material comprising hydroxypropyl cellulose ether is either incorporated in said layer which includes said diazonium compound or applied thereto to produce a surface roughness, and hydroxypropyl ether being present in an amount of 0.25 to 30 mg/dm^2 of the film surface.

4,088,493

DIFFUSION RETARDING LAYERS COMPRISING POLYMERS OF DIMETHOXYETHYLENE

Werner Krafft, Leverkusen; Gunther Matschke, Opladen, and Erich Wolff, Leverkusen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 20, 1975, Ser. No. 633,801
Claims priority, application Germany, Nov. 26, 1974, 2455762
Int. Cl.² G03C 1/40, 7/00, 5/54
U.S. Cl. 96—77 1 Claim



1. A light-sensitive product for dye diffusion transfer comprising

a light-sensitive film unit including at least one supported light-sensitive silver halide emulsion layer and a non-diffusing dye-giving compound associated with the silver halide emulsion layer

an image-receiving layer in contact with the film unit to form with the unit a laminate

a neutralisation system arranged on at least one side of the laminate, said system comprising a neutralisation layer with a polymer which contains free acid groups, said system being effective in aqueous alkaline processes of said product and

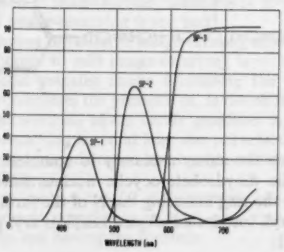
a retarding layer containing a polymerisation product of at least 80 mol % of dimethoxyethylene and 0 to 20 mol % of one or more comonomers selected from compounds with a polymerisable double bond other than dimethoxyethylene said retarding layer being positioned between the laminate and the neutralisation layer.

4,088,494

SULFUR-SENSITIZED AgX EMULSION CONTAINING CUBIC AgX GRAINS AND A MERCAPTAN SENSITIZER

Tadaaki Tani, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 615,752, Sep. 22, 1975, abandoned. This application Sep. 1, 1977, Ser. No. 829,859
Claims priority, application Japan, Sep. 20, 1974, 49-108997
Int. Cl.² G03C 1/28
U.S. Cl. 96—107 13 Claims



1. A chemically sulfur-sensitized silver halide photographic emulsion which contains:

(1) at least 80 mol% silver bromide or silver chloride; wherein at least 80% by weight of all of the silver halide particles present are of the cubic crystal form; and in addition to said sulfur sensitizer

(2) a sensitizing amount of an organic compound having at least one mercapto group and capable of reacting with a silver ion to form a water-insoluble silver salt, said organic compound having a 1,3,4-thiadiazole ring and a pKa of not more than 7.6, said pKa is measured in water at 25° C at an ionic strength of 0.1.

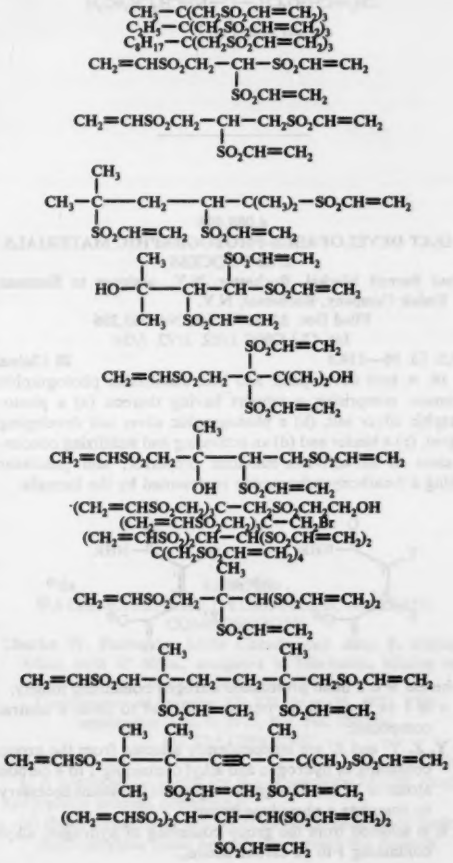
4,088,495

SILVER HALIDE PHOTOGRAPHIC ELEMENT CONTAINING A GELATINOUS LAYER HARDENED WITH AN ALIPHATIC HYDROCARBON HAVING AT LEAST THREE VINYLSULFONYL GROUPS

Teiji Habu; Shinobu Korematsu; Tsuneo Wada; Takayosi Omura; Hiroki Ishii, and Takashi Sasaki, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Hino, Japan

Continuation of Ser. No. 622,396, Oct. 14, 1975, abandoned. This application Sep. 9, 1977, Ser. No. 832,067
Claims priority, application Japan, Oct. 14, 1974, 49-118457
Int. Cl.² G03C 1/30
U.S. Cl. 96—111 5 Claims

1. A silver halide photographic element comprising a support and at least one gelatinous layer coated thereon, said layer being hardened with a compound selected from the group consisting of



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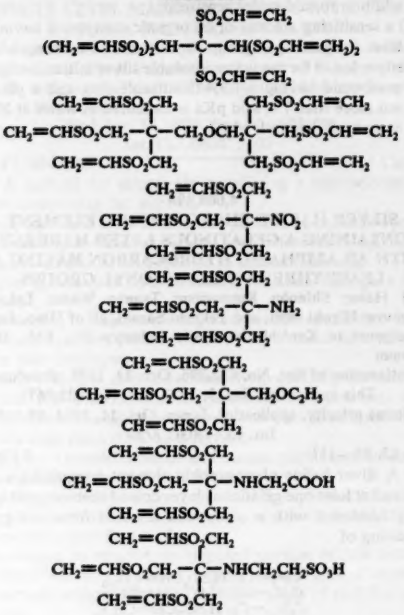


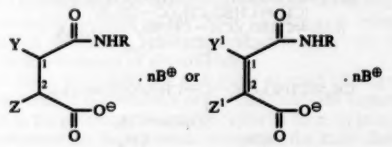
4,088,496

HEAT DEVELOPABLE PHOTOGRAPHIC MATERIALS AND PROCESS

Paul Barrett Merkel, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 22, 1976, Ser. No. 753,236
Int. Cl.[2] G03C *1/02, 1/72, 1/34*
U.S. Cl. 96—114.1 28 Claims

18. A heat developable and heat stabilizable photographic element comprising a support having thereon (a) a photographic silver salt, (b) a photographic silver salt developing agent, (c) a binder and (d) an activating and stabilizing concentration of an activator-stabilizer precursor, said precursor being a 2-carboxycarboxamide represented by the formula:

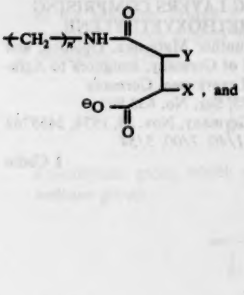


wherein B is a basic protonated nitrogen containing moiety;

n is 1 or 2 and is an integer sufficient to form a neutral compound;

Y, Z, Y[1] and Z[1] are independently selected from the group consisting of hydrogen and alkyl containing 1 to 4 carbon atoms or Y[1] and Z[1] together represent the atoms necessary to complete a phenylene group;

R is selected from the group consisting of hydrogen, alkyl containing 1 to 10 carbon atoms,



wherein *n'* is 1 to 6; and X is the same as Z and X[1] is the same as Z[1]; said (d) being contiguous to (a) and (b).

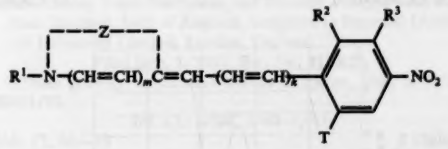
4,088,497

ACUTANCE AGENTS FOR USE IN THERMALLY-DEVELOPABLE PHOTOSENSITIVE COMPOSITIONS

Harvey A. Brown, Lake Elmo, and Jack E. Reece, Forest Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 687,003, May 17, 1976, Pat. No. 4,033,948. This application Mar. 25, 1977, Ser. No. 781,147
Int. Cl.[2] G03C *1/02, 1/72, 1/84, 5/24*
U.S. Cl. 96—114.1 5 Claims

1. In a photosensitive, heat-developable, dry silver sheet material containing an image forming system including in one layer a photosensitive silver halide catalyst-forming means and, as heat image-forming means, an organic silver compound, said image-forming system further including toner and a reducing agent the oxidation-reduction reaction of which latter with said organic silver compound being catalyzed by silver halide catalyst; the improvement characterized by the inclusion in said layer with said organic silver compound of an acutance agent represented by the formula



wherein:

Z represents the atoms necessary to complete a mono-or polycyclic dihydroheterocyclic nucleus having 5 to 6 atoms in the ring including the N of the formula;

R^1 is an alkyl, substituted alkyl, alkenyl or aryl group;

$m = 0$ or 1;

$k = 0$, 1 or 2;

T is an aprotic electron-withdrawing group having a σ_{para} value of 0.45 to 0.63 selected from CF_3 or CN and R^2 and R^3 are hydrogen or together constitute a condensed carbocyclic aromatic ring.

4,088,498

PHOTOPOLYMERIZABLE COPYING COMPOSITION

Raimund Josef Faust, Wiesbaden-Biebrich, Germany, assignor to Hoechst Aktiengesellschaft, Germany

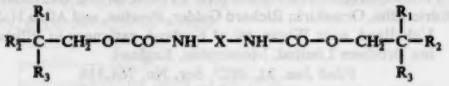
Continuation of Ser. No. 366,570, Jun. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 212,372, Dec. 27, 1971, abandoned. This application May 20, 1976, Ser. No. 688,450

Claims priority, application Germany, Dec. 28, 1970, 2064079

Int. Cl.[2] G03C *1/68, 1/94;* C08F *8/00*

U.S. Cl. 96—115 P 7 Claims

1. A photopolymerizable composition comprising at least one photoinitiator, at least one binder and from 20 to 80 parts by weight, per 100 parts by weight of the sum of binders and monomers, of at least one polymerizable compound having the formula



wherein

X is a saturated hydrocarbon group having 4 to 12 carbon atoms, and containing at least one lateral methyl group,

R_1 is an alkyl group having 1 to 3 carbon atoms, R_4 or $-CH_2R_4$,

R_2 and R_3 are H, CH_3, or $-CH_2R_4$,

R_4 is $-O-CO-CR_5=CH_2$, and

R_5 is H or CH_3,

R_4 being present in at least one of the groups R_1, R_2 and R_3, said composition also containing at least 20 and not more than 80 parts by weight of binders per 100 parts by weight of the sum of monomers and binders.

4,088,499

SELECTIVELY PERMEABLE LAYERS FOR DIFFUSION TRANSFER FILM UNITS

David Philip Brust; Tsang Jan Chen; Ignazio Salvatore Ponticello, and Zona Reynolds Pierce, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 1, 1976, Ser. No. 701,935

Int. Cl.[2] G03C *7/00, 5/54, 1/40, 1/48*

U.S. Cl. 96—29 D 32 Claims

32. In a process for forming transfer images which comprises, in combination, the steps of:

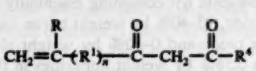
(a) exposing a photographic film unit which comprises a support having thereon at least one silver halide emulsion layer in association with an image dye or an image dye-providing material which is capable of diffusing to an image receiving layer, a developing agent, and a means containing an alkaline processing composition adapted to discharge its contents within said film unit;

(b) processing said film unit with said alkaline processing composition;

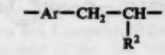
(c) diffusion of image-forming materials or products thereof to said image-receiving layer; and

(d) preventing diffusion of image-forming materials or products thereof to said image-receiving layer subsequent to substantial transfer image formation; the improvement which comprises the presence of, in the photographic film unit, between all silver halide emulsion layers and said image-receiving layer, at least one pH selectively permeable layer comprising a homopolymer or a copolymer comprising:

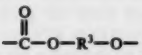
(I) from about 1 to 100 mole percent of a polymerized monomer containing at least one active methylene group and having the formula:



wherein n is 0 or 1; R is hydrogen or methyl; R^1 is substituted or unsubstituted arylenethylene having the structure:



wherein Ar is arylene and R^2 is hydrogen, alkyl, aryl or cycloalkyl, or R^1 has the formula:



wherein R^3 is alkylene, arylene or cycloalkylene; R^4 is alkyl, alkoxy or amino when n is equal to 0, and R^4 is alkyl, alkoxy, amino, cycloalkyl or aryl when n is equal to 1;

(II) from 0 to about 90 mole percent of at least one additional hydrophilic polymerized ethylenically unsaturated monomer; and

(III) from 0 to about 80 mole percent of at least one additional hydrophobic polymerized ethylenically unsaturated monomer;

whereby said pH selectively permeable layer allows diffusion of image-forming materials and products thereof at a pH in excess of 11 and prevents such diffusion at a pH less than 7.

4,088,500

WATER EXTENDED HYDROPHILIC MOLDING COMPOSITIONS

Charles W. Fairbanks, Little Canada, and John F. Kistner, Afton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

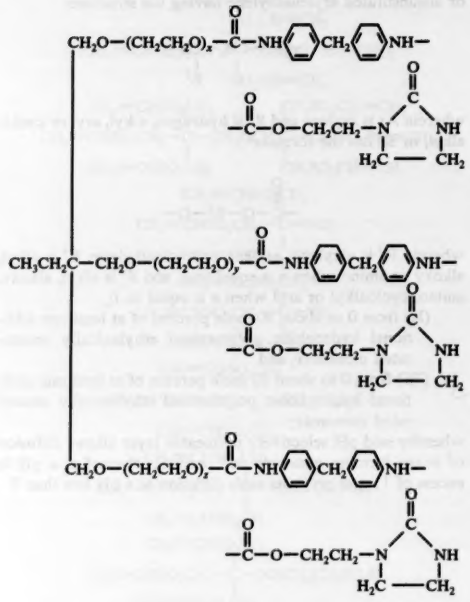
Continuation of Ser. No. 128,172, Mar. 25, 1971. This application Aug. 9, 1973, Ser. No. 386,984

Int. Cl.[2] C09K *3/00*

U.S. Cl. 106—35 6 Claims

1. A composition useful for the preparation of soft, tough, hydrophilic articles, comprising:

(a) about 100 parts by weight of an amide-endcapped hydrophilic alkylene oxide prepolymer having the formula

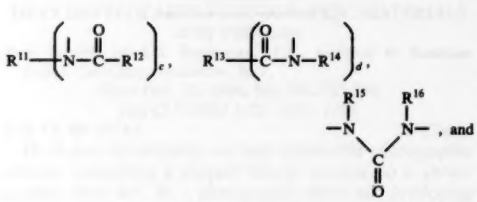


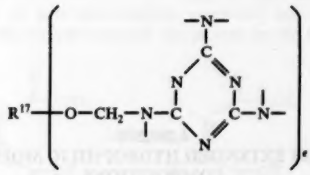
wherein *x*, *y* and *z* are integers of from 5 to 25;

(b) from 2 to 8 parts of an acid activated cross linking agent which is a compound having the formula

$$R^9\text{-}CH_2OR^{10})_b$$

wherein R^9 is a polyvalent organic nitrogeneous residue selected from the group consisting of





wherein R^{11} and R^{13} are polyvalent organic residues having a combining valency of *c* and *d* respectively; *c* and *d* are integers having a value of from 2 to 4; R^{12}, R^{14}, R^{15}, and R^{16} are selected from the group consisting of hydrogen and lower alkyl groups having from 1 to 6 carbon atoms, and R^{14} and R^{15} together may form a ring with the nitrogen atom having 4 to 7 atoms therein; R^{17} is a polyvalent radical of an organic polyhydroxy alkyl compound having *e* hydroxyl groups but devoid of such groups, *e* is an integer from 1 to 6; and where *e* is 1, R^{17} is a lower alkyl group having from 1 to 6 carbon atoms; R^{10} is a lower alkyl group having from 1 to 6 atoms; and *b* is an integer from 2 to 6;

(c) from 20 to 50 parts by weight of water;

(d) from 20 to 45 parts by weight of a suitable filler; and

(e) from 0.1 to 3 parts by weight of a catalyst selected from the group consisting of acids having a pK_a less than 4, and latent acid generating compounds capable of generating an acid having a pK_a less than 4 upon heating at a temperature of at least 50° C.

4,088,501

PHOTOCHROMIC ALUMINO-PHOSPHATE GLASSES

Edric Ellis, Ormskirk; Richard Gelder, Preston, and Allan Hale, Upholland, near Wigan, all of England, assignors to Pilkington Brothers Limited, Merseyside, England

Filed Jan. 31, 1977, Ser. No. 764,314

Claims priority, application United Kingdom, Jan. 30, 1976, 3813/76

Int. Cl.² C03C *3/26, 3/10, 3/04*

U.S. Cl. 106—52 **8 Claims**

1. A photochromic boron-free alumino-phosphate glass having silver halide crystals dispersed throughout the glass, the glass comprising, in weight percentages:

SiO_2	10 to 17%
Al_2O_3	20 to 29%
P_2O_5	30 to 40%
R_2O	8.5 to 17%
R'O	4 to 18%

where R_2O represents Na_2O and/or K_2O; R'O represents CaO and/or BaO, the CaO content being at least 4% if BaO is absent and being from 0 to 7% if BaO is present, while the BaO content is from 0 to 18%; the total of $SiO_2 + Al_2O_3 + P_2O_5$ amounting to not less than 69% by weight of the glass; and, in weight percentages, expressed as quantities over and above the 100% total of all other components:

Ag_2O	0.07 to 0.35%
CuO	0.005 to 1.0%
Cl + Br	0.4 to 2.0%
Cl	0 to 1.0%
Br	0.20 to 1.0%.

4,088,502

CORROSION RESISTANT CASTABLE REFRACTORY MIX

Richard G. La Bar, Export, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 639,993, Dec. 12, 1975, abandoned. This application Jan. 17, 1977, Ser. No. 759,984

Int. Cl.² C04B *35/02, 7/32, 35/02*

U.S. Cl. 106—64 **6 Claims**

1. A particulate refractory mixture capable of mixture with water to form a castable refractory having enhanced corrosion resistance to molten aluminum consisting essentially of: 90–94% by weight refractory material and 6–10% by weight of a zinc borosilicate frit consisting essentially of 50–60% by weight zinc oxide, 20–40% by weight boron oxide, 8–12% by weight silicon oxide and 0–10% by weight aluminum oxide with less than 0.55% by weight impurities in the frit and not more than 1% by weight impurities in the refractory mixture.

4,088,503

BACKING FOR WELD UNDERSIDE FORMATION

Alexandr Viktorovich Demin, ulitsa Plekhanova, 28, korpus 2, kv. 105, Moscow; Igor Nikolaevich Balezin, 1 Mikroraion, 6, kv. 24, Mtsensk Orlovskoi oblasti; Konstantin Alexeevich Kosinsky, ulitsa Uritskogo, 8, kv. 29, Ljubertsy Moskovskoi oblasti; Vladimir Nikolaevich Serebrennikov, prospekt Lenina, 28, kv. 59, Orsk Orenburgskoi oblasti; Vadim Likarionovich Popov, 5, kv. 38, Lytkarino Moskovskoi oblasti; Nikolai Nikolaevich Shipkov, ulitsa Moldogulovoi, 18, korpus 2, kv. 157, and Eduard Fedorovich Dovguchits, Bezbozhny pereulok, 38, kv. 66, both of Moscow, all of U.S.S.R.

Filed Aug. 9, 1976, Ser. No. 712,663
Int. Cl.[2] C04B *35/52*
U.S. Cl. 106—56 3 Claims

1. A backing for the weld underside formation, said backing being prepared from a melting stock and consisting essentially of, in percentages by weight:

oil coke — 60–70%
graphite — 7–8%
high-temperature pitch — 10–15%
titanium — 13–15%.

4,088,504

METHOD OF PRODUCING HIGH STRENGTH CEMENT CONGLOMERATES

Mario Collepardi, Rome, Italy, assignor to Emesa Aktiengesellschaft, Eschen, Liechtenstein

Filed Jun. 11, 1976, Ser. No. 695,114
Claims priority, application Italy, Jun. 13, 1975, 84134 A/75
Int. Cl.[2] C04B *7/02*
U.S. Cl. 106—90 22 Claims

1. A method for producing high strength cement conglomerates comprising adding to a mix of water, inorganic binder and aggregates a mixture containing:

a polymer obtained by polycondensation of an aldehyde with a sulphonic acid of the aromatic series, free or salifed, soluble in water (Component No. 1), and

a product of the hydrolysis of starch obtained from any raw vegetable material (Component No. 2).

8. The method as defined in claim 1, comprising adding as a third component (component No. 3) to the said admixture, a water soluble inorganic electrolyte.

4,088,505

ANIONIC BITUMINOUS EMULSIONS

Howard H. Moorer, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 452,018, Mar. 18, 1974, Pat. No. 3,956,002. This application Jan. 27, 1976, Ser. No. 652,721
Int. Cl.[2] C08L *95/00*; G09D *3/24*
U.S. Cl. 106—277 15 Claims

1. An oil-in-water anionic bituminous emulsion which comprises;

(a) from about 30% to about 75% by weight of the emulsion of bitumen as the disperse phase,

(b) from about 0.1% to about 10.0% by weight of the anionic emulsifier consisting of the alkali metal salt of an alkali lignin wherein said alkali metal salt is formed from a member of the group of alkali metals consisting of sodium, potassium and lithium and the ethylene oxide adduct of an alkyl phenol wherein said alkyl phenol is nonyl phenol, octyl phenol or dodecyl phenol in a weight ratio of 10:1 to 1:10 of lignin to said alkyl phenol adduct, and

(c) water in an amount to make up 100% by weight as the continuous phase.

4,088,506

PROCESS FOR PREPARING PIGMENTARY QUINACRIDONE USING LOW-SALT MILLING

Roland Herman Wetzel, Landenburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 748,768, Dec. 8, 1976, abandoned. This application Apr. 15, 1977, Ser. No. 787,995
Int. Cl.[2] C08J *3/00*
U.S. Cl. 106—288 Q 3 Claims

1. In a process for converting crude quinacridone to pigmentary form by dry milling the crude quinacridone, contacting the milled quinacridone with an organic liquid in water emulsion, and recovering the quinacridone in pigmentary form,

the improvement comprising dry milling the crude quinacridone in the presence of from 5% to 50% by weight of aluminum sulfate, based on the weight of the crude quinacridone.

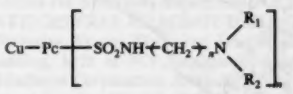
4,088,507

PHTHALOCYANINE PIGMENT COMPOSITIONS

Tuneo Tanaka; Sengo Ishizuka; Keniti Tokuda, and Akimitsu Suzuki, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1977, Ser. No. 791,279
Claims priority, application Japan, Apr. 30, 1976, 51-48646
Int. Cl.[2] C08K *5/00*
U.S. Cl. 106—288 Q 3 Claims

1. A copper phthalocyanine pigment composition consisting essentially of 100 parts by weight of copper phthalocyanine and 0.5 – 30 parts by weight of a copper phthalocyanine derivative having the following general formula



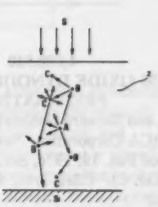
wherein Cu - Pc - is the residue of copper phthalocyanine, *m* and *n* are each an integer of from 1 to 4, and R_1 and R_2 are each a substituted or non-substituted alkyl group or a heterocyclic group containing the nitrogen atom of the formula.

4,088,508

AMPLIFYING DEVICE OF RADIANT ENERGY

Philippe Edouard Gravisse, 9, Residence Boieldieu, Puteaux, France (92800)

Filed Mar. 30, 1977, Ser. No. 783,043
Claims priority, application France, Mar. 31, 1976, 76 09321
Int. Cl.[2] H01L *31/04*
U.S. Cl. 136—89 HY 10 Claims



1. A radiant energy amplifying device, particularly suitable for a photovoltaic cell or other pickup, which cumulatively receives energies coming from short wavelengths by a plurality of scintillating materials with high quantum yield operating in cascade wherein the absorption spectrum of one of the scintillating materials overlaps the emission spectrum of the other scintillating material, except for the material that is at the beginning of the cascade, absorbing toward the shortest wavelengths, characterized in that said scintillating materials, which

are distributed homogeneously in a matrix made of solid synthetic polymeric material whose absorption threshold is at a wavelength less than the absorption zone of the scintillating material located at the beginning of the cascade, are present in said matrix in a proportion varying, according to the material, from 2×10^{-3} to 10^{-7} mole/kg of resin, the highest concentration corresponding to said material located at the beginning of the cascade.

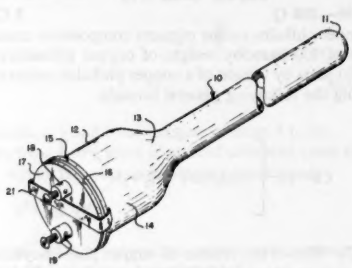
2. Amplifying device according to claim 1, in combination with a photovoltaic cell underlying said device, characterized in that the emission spectrum of the scintillating material placed at the end of the cascade, toward the longest wavelengths, corresponds to the maximal sensitivity zone of the photovoltaic cell.

4,088,509

THERMOCOUPLE PROTECTION TUBES

Joseph E. Blaze, Jr., Beaver Falls, Pa., assignor to McDanel Refractory Porcelain Company, Beaver Falls, Pa.

Filed Mar. 4, 1977, Ser. No. 774,258
Int. Cl.² H01L *35/06*
U.S. Cl. 136—235 **6 Claims**



1. An all ceramic thermocouple protector comprising a tubular elongate ceramic thermocouple protector closed at one end and open at the other to receive a thermocouple, an adjacent larger diameter cylindrical ceramic housing spaced from said tubular elongate thermocouple protector and connected thereto by a hollow frusto conical ceramic member having a taper in the range 20° to 60° and an annular pocket in the end of said housing remote from the frusto conical portion adapted to receive a cover.

4,088,510

MAGNESIUM OXIDE DYNODE AND METHOD OF PREPARATION

Joseph Dresner, and Bernard Goldstein, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 19, 1976, Ser. No. 659,250
Int. Cl.² C23F *7/06*; H01J *1/32*
U.S. Cl. 148—6.3 **19 Claims**

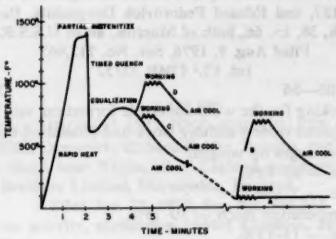
1. A dynode comprising
an electrically conducting substrate; and
a layer of magnesium oxide on said substrate, said layer formed by preparing a layer of oxidized magnesium on said substrate, treating the layer to render it more nearly stoichiometric wherein said treating includes heating said oxidized magnesium layer in a vacuum of less than about 10^{-7} torr at a temperature between about 400° and 500° C and exposing said dynode to oxygen at about room temperature.

4,088,511

STEELS COMBINING TOUGHNESS AND MACHINABILITY

Michael J. Rowney, Park Forest, Ill., assignor to LaSalle Steel Company, Chicago, Ill.

Filed Jul. 29, 1976, Ser. No. 709,626
Int. Cl.² C21D *1/20*
U.S. Cl. 148—12 F **54 Claims**



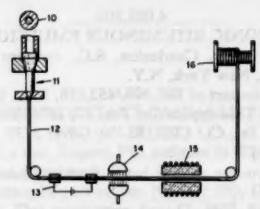
1. A method for the strengthening of carbon and low alloy steels comprising
(1) partially austenitizing a carbon or low alloy steel to produce a ferrite-austenite mixture,
(2) quenching the partially austenitized steel to an intermediate temperature above the M_s temperature for the steel at a rate sufficient to avoid transformation of the austenite to ferrite and pearlite, and
(3) working the quenched steel at a temperature ranging from ambient temperature up to a temperature at which bainite can exist
whereby the ferrite-austenite mixture is converted to a ferrite-bainite mixture having high levels of machinability, strength and toughness.

4,088,512

QUENCH-AGE METHOD FOR THE FABRICATION OF NIOBIUM-ALUMINUM SUPERCONDUCTORS

Milton R. Pickus, Oakland, and Robert L. Ciardella, Cardiff, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 21, 1977, Ser. No. 761,022
Int. Cl.² H01L *39/00*
U.S. Cl. 148—11.5 F **12 Claims**



1. A method for producing a functional shaped niobium-aluminum composite superconductor comprising Nb_3Al in the A-15 phase, which method comprises:
heat treating a functional shaped composite of elemental niobium and aluminum at a temperature in the high temperature solid solution region of the Nb-Al phase diagram such that a metastable solid solution of Al in Nb is formed upon subsequent quenching;
quenching the heat treated composite at a rate sufficient to form a metastable solid solution of Al in Nb and substantially prevent transformation to the A-15 phase; and

transforming the metastable solid solution to the A-15 phase by low temperature aging.

11. A method according to claim 1 wherein the metastable solid solution is deformed to produce mechanical twinning prior to the aging treatment.

4,088,513

METHOD FOR HEATING A SILICON-CONTAINING STEEL SLAB IN A WALKING-BEAM TYPE HEATING FURNACE

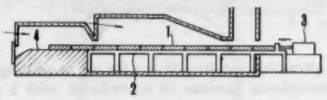
Kichi Nakazawa; Masafumi Okamoto; Kiyoshi Tanaka, and Tadashi Sakazaki, all of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed May 14, 1976, Ser. No. 686,664

Claims priority, application Japan, Apr. 3, 1976, 51-36710

Int. Cl.² H01F *1/04*

U.S. Cl. 148—112 **3 Claims**



1. In a method for heating a grain-oriented electrical steel slab containing 2.5 to 4% Si to a temperature not lower than 1260° C in a continuous walking-beam type heating furnace, the improvement comprising:

charging the slabs one after the other into the said furnace through the charge inlet thereof and moving the successive charged slabs into contact with the last of the slabs already in the furnace for causing the rear end of a preceding slab to substantially contact the front end of a subsequent slab during the heating in the furnace;

transferring the slabs through the furnace by means of the walking-beam means of the furnace having fixed beams and a walking-beam means while operating the walking-beam means for limiting the contact time of the slabs with the fixed beams to not more than three times the contact time of the slabs with the walking-beam means; and

separating the adjacent slabs approaching the extraction outlet of the furnace a distance not less than one-fifth the slab thickness for remelting solidified slag adhering to the slabs on opposite sides of the spaces between the thus separated slabs.

4,088,514

METHOD FOR EPITAXIAL GROWTH OF THIN SEMICONDUCTOR LAYER FROM SOLUTION

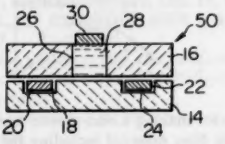
Tohru Hara; Minoru Mihara, and Nobuyuki Toyoda, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Apr. 9, 1976, Ser. No. 675,491

Claims priority, application Japan, Apr. 17, 1975, 50-47043; May 9, 1975, 50-54857

Int. Cl.² H01L *21/208*

U.S. Cl. 148—171 **4 Claims**



1. A method for liquid-phase epitaxial growth of a thin layer of a Group III-V semiconductor material on a substrate from solution, comprising the steps of:

(a) preparing an undersaturated solution of a Group III–V semiconductor material in a metal melt at a predetermined first temperature, the concentration of said semiconductor material in said undersaturated solution being about 5% to about 10% below the solubility of said semiconductor material in said melt at said first temperature;

(b) contacting said undersaturated solution with a separate source of said semiconductor material at said first temperature to render said undersaturated solution an ideally saturated solution which is free from any precipitate;

(c) lowering the temperature of said ideally saturated solution at a constant rate to a predetermined second temperature to give a supercooled solution, the difference between said first temperature and said second temperature being within the range between 0.5° C and 5° C, said ideally saturated solution being kept isolated from any source of said semiconductor material at this step;

(d) contacting said supercooled solution with a substrate which has been brought to said second temperature;

(e) lowering the temperature of said supercooled solution and said substrate at a constant rate until epitaxial growth on said substrate reaches a desired thickness; and

(f) separating said supercooled solution from said substrate to terminate the epitaxial growth and lowering the temperature of said substrate at a rate greater than the rate at step (e).

4,088,515

METHOD OF MAKING SEMICONDUCTOR SUPERLATTICES FREE OF MISFIT DISLOCATIONS

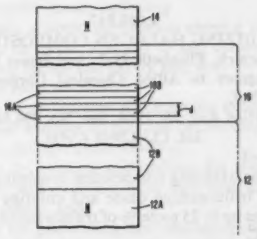
A. Eugene Blakeslee, Mount Kisco, and John Wauchope Matthews, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 351,722, Apr. 15, 1973, abandoned.

This application Apr. 4, 1975, Ser. No. 565,298

Int. Cl.² H01L *21/20, 29/06*

U.S. Cl. 148—175 **33 Claims**



1. A process for forming a coherent, substantially dislocation free multilayer crystal comprising the steps of:

selecting a suitable substrate crystal; and

depositing on said substrate crystal a plurality of alternate layers of a first and second crystalline material with different lattice parameters, wherein the alternating layers comprise alloy compositions $IV_{1-x}IV_x$, $III_{1-x}III_xV$, excluding said III_{1-x} and said III_x being Ga and Al, or $III\ V_{1-x}V_x$, wherein x alternates in successive layers between two values both of which lie between 0 and 1 and III, IV, and V represent elements of Groups IIIa, IVa, Va respectively, of the Periodic Table,

said layers being of less than a maximum critical thickness given by $h_c = 4Qa_{SL}/P(a_A - a_B)$ and

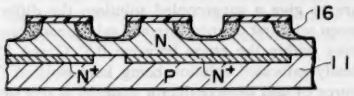
having an average lattice parameter equal to the lattice parameter of the substrate.

4,088,516

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

Hiroyuki Kondo, Tokyo; Takahisa Nitta, Fuchu, and Yoshiro Moriguchi, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 29, 1976, Ser. No. 737,032
Claims priority, application Japan, Oct. 29, 1975, 50-129238
Int. Cl.[2] H01L 21/22
U.S. Cl. 148—187 19 Claims



1. In a method of manufacturing a semiconductor device, the improvement for which includes the steps of:

(a) forming on a surface of a semiconductor substrate of a first conductivity type a semiconductor layer of a second conductivity type opposite to the conductivity type of said semiconductor substrate,

(b) masking desired parts of a surface of said semiconductor layer with a material which is impervious to an etchant for said semiconductor layer,

(c) exposing said semiconductor layer to the etchant, to thereby etch semiconductor layer parts which lie directly beneath end parts of the etchant-impervious material and semiconductor layer parts which are not masked so as to form recesses in said semiconductor layer,

(d) causing a solution to preferentially adhere to end parts of said recesses directly beneath said end parts of said etchant-impervious material, said solution being capable of conversion into a semiconductor oxide by a predetermined heat treatment, and

(e) oxidizing said semiconductor layer from the etched semiconductor layer surface parts down to said semiconductor substrate by subjecting the resultant semiconductor device to said heat treatment.

4,088,517

OXIDIZING HALOGEN COMPOSITION

Bernard Sukornick, Elizabeth, N.J., and James B. Beal, Tulsa, Okla., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Aug. 28, 1964, Ser. No. 394,645
Int. Cl.[2] C06B 47/00
U.S. Cl. 149—1 5 Claims

1. A storable oxidizing composition consisting essentially of a solution of trifluoramine oxide and chlorine pentafluoride, which contains up to 25 mole % of trifluoramine oxide in liquid phase at 24° C.

4,088,518

HEAT-STABLE MOLDED COMPOSITE EXPLOSIVES AND PRODUCTION

Jean-Paul Andre Kehren, and Robert Andre Ousset, both of Sorgues, France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Jul. 19, 1976, Ser. No. 706,628
Claims priority, application France, Jul. 30, 1975, 75 23735
Int. Cl.[2] C06B 45/22
U.S. Cl. 149—11 20 Claims

1. A process for the production of a heat-stable composite explosive, which comprises the steps of

(i) coating at least one crystalline explosive powder having a high rate of detonation, in the presence of water, with a mixture of a prepolymer of a thermosetting silicone resin and a cross-linking catalyst therefor, whereby coated moulding powder is obtained,

(ii) drying and cross-linking the coated molding powder, and

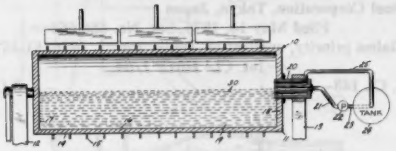
(iii) cold compressing the cross-linked molding powder to form a shaped composite explosive.

4,088,519

HEAT CONTROL FOR ULTRASONIC PATTERN ROLLS

Charles A. Johnson, Rockingham, N.C., assignor to Home Curtain Corp., Far Rockaway, N.Y.

Filed May 12, 1977, Ser. No. 796,413
Int. Cl.[2] B32B 5/20
U.S. Cl. 156—73.1 3 Claims



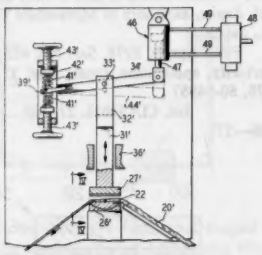
1. In an ultrasonic welding device for use in quilting a plurality of thermoplastic laminae in accordance with a predetermined pattern, said device including a plurality of sonic horns and a cylindrical pattern roll having an outer surface positioned opposite said horns in predetermined spaced relation thereto to form a gap through which said laminae are passed during welding, improved means for maintaining said last mentioned spaced relation during operation by preventing thermal distortion of said roller, said means including: a supply of coolant filling substantially less than the hollow interior of said pattern roll, a coolant reservoir, conduit means interconnecting said reservoir with said interior, and means for circulating said coolant between said interior of said roll and said reservoir; whereby localized heat generated during welding at specific areas on the outer surface of said roll is distributed through the wall thereof to said coolant, and through rotation of said roll to the total mass thereof, said distribution preventing distortion of said roll as the same warms with use.

4,088,520

METHOD OF DENSIFYING NEEDLED NON-WOVEN WEBS

Lennart Eino Olavi Suominen, Nakkila, Finland, assignor to J. W. Suominen OY, Finland

Continuation-in-part of Ser. No. 523,117, Nov. 12, 1974, abandoned. This application Jun. 21, 1976, Ser. No. 698,152
Int. Cl.[2] B32B 5/00
U.S. Cl. 156—73.6 11 Claims



1. A process for making a non-woven needle punched web of thermoplastic fiber material including the step of:

subjecting the entire thickness of a non-woven needle punched web comprised of thermoplastic fibrous material to repeated sharp blows effecting compressing and release pressure of a sufficient magnitude and for a sufficient duration to generate internal heat between fibers;

and thereby increasing the internal temperature and soften-

ing said fibrous material and reducing the internal original interstices between said fibrous material and compacting said fibers of the fibrous material into a more intimate locked contact with each other and causing adherence therebetween and maintaining a compact web condition.

4,088,521

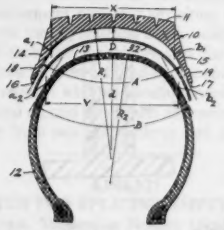
METHOD OF RETREADING A TIRE WITH AN ENDLESS PREMOLDED TREAD

Duward Harding Neal, Muncie, Ind., assignor to Tred-X Corporation, Muncie, Ind.

Division of Ser. No. 271,350, Jul. 13, 1972, Pat. No. 3,815,651. This application Nov. 7, 1973, Ser. No. 413,656

Int. Cl.² B29H *17/37*

U.S. Cl. 156—96 **7 Claims**



1. A method of treading a tire including installing an endless premolded replacement tread on a tire casing having a predetermined inflated diameter, the replacement tread having a central tread portion of a diameter less than such predetermined diameter of the tire casing and a pair of opposed integral shoulder wings which terminate in a circular bottom edge having a diameter less than such central tread portion diameter, comprising the steps of preparing the tread area of the tire casing, inflating the tire casing to its road pressure, applying an adhesive layer to the tire casing, stretching the replacement tread by expanding the entire replacement tread while maintaining the molded relationship between the central tread portion and the integral shoulder wings, releasing the replacement tread at atmospheric pressure onto the tire casing, whereby the replacement tread is held under tension forces closely against the tire casing, biasing the edges of the replacement tread against the tire casing to effect a fluid seal between the circular bottom edges of the shoulder wings and the tire casing, stitching the replacement tread with pressure forces to remove entrapped air and curing the replacement tread and tire casing assembly in an autoclave without placing the assembly in a bag or similar device.

4,088,522

METHOD AND APPARATUS FOR SEALING THE FOUR EDGES OF A MULTIPLE PANE WINDOW

Alain Mercier, Courbevoie, and Yves Fournier, Chalon-sur-Saone, both of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Oct. 15, 1975, Ser. No. 622,539

Claims priority, application France, Oct. 15, 1974, 74 34640

Int. Cl.² B32B *31/00*; B05B *7/00*

U.S. Cl. 156—107 **22 Claims**

1. A method for automatically and continuously applying plastic material to the four edges of a multiple-pane window comprising the steps of

(a) placing and centering a multiple-pane window on a first carrier therefor,

(b) advancing the centered multiple-pane window along a first predetermined path,

(c) simultaneously applying plastic material to two opposite edges of the multiple-pane window by a pair of nozzles,

(d) transferring the multiple-pane window from the first carrier to a second carrier by rotating the multiple-pane window in such a fashion as to orient the uncoated edges in a position such that they may be subsequently coated,

(e) advancing the transferred multiple-pane window along a second predetermined path by the second carrier between a second pair of spaced apart nozzles,

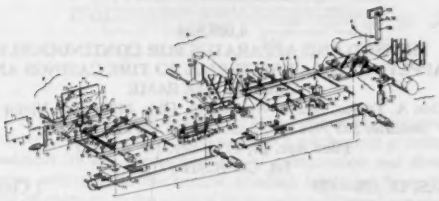
(f) simultaneously applying plastic material to the two uncoated opposite edges of the multiple-pane window, and

(g) measuring a predetermined function of the length of the multiple-pane window as it is advanced by the first carrier along the first predetermined path, and automatically having the spacing of the second pair of nozzles adjusted in order to generally correspond to the spacing between the two uncoated edges of the window in response to said measuring.

6. Apparatus for applying plastic material to the four edges of a multiple-pane window which comprises

(a) a first pair of opposed injection nozzles equidistantly spaced from a longitudinal axis;

(b) first carrier means for moving said multiple-pane window horizontally along a longitudinal axis between said first pair of nozzles for simultaneously applying plastic material to two opposite edges of the multiplepane window;



(c) a second pair of opposed injection nozzles positioned downstream of said first pair with respect to the path of travel of the multiple-pane window and likewise equidistantly spaced from said longitudinal axis;

(d) second carrier means for moving said multiple-pane window horizontally along said axis between said second pair of nozzles for simultaneously applying plastic material to two opposite edges of said multiple-pane window; and (e) transfer means including

(1) a column adapted for rotation about a vertical axis,

(2) an arm extending laterally of said column,

(3) grasping means carried by said arm for grasping said multiple-pane window,

(4) means for positioning said grasping means over a multiple-pane window on said first carrier means and grasping said multiple-pane window,

(5) means for rotating said column for transferring said multiple-pane window from said first to said second carrier means, and

(6) means for positioning said multiple-pane window on said second carrier means in an orientation so that the edges uncoated by said first pair of nozzels are in position for coating by said second pair of nozzles and releasing said multiple-pane window.

4,088,523

PROCESS FOR INJECTION MOLDING A TIRE HAVING A CROWN AND SIDEWALLS OF DIFFERENT COMPOSITIONS

Achille Gallizia, Milan, and Giorgio Tangorra, Monza (Milan), both of Italy, assignors to Industrie Pirelli S.p.A., Milan, Italy

Filed Jul. 16, 1975, Ser. No. 596,409

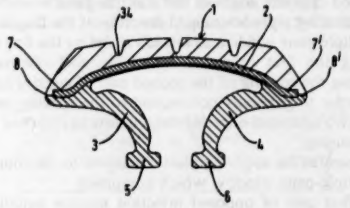
Claims priority, application Italy, Jul. 19, 1974, 25356 A/74

Int. Cl.² B29H *5/00, 17/02*

U.S. Cl. 156—125 **15 Claims**

1. A process for the manufacture of tires comprising a crown made of a first compound and including an annular reinforcing structure and sidewalls made of a second compound, including

the steps of preparing the reinforcing structure, introducing the same into a mold defining the desired final shape of the complete tire, injecting separately but substantially simultaneously the first compound and the second compound into the mold to fill the free space in said mold so that said first and



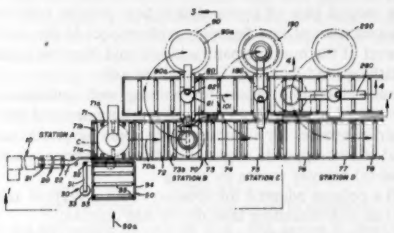
second compounds flow the one towards the other at least in the delimiting zone between the crown and each sidewall, controlling the relative volumes of the said first and second compounds so injected into the mold to define the delimiting surface between the crown and each sidewall.

4,088,524

METHOD AND APPARATUS FOR CONTINUOUSLY APPLYING TREAD MATERIAL TO TIRE CASINGS AND CURING THE SAME

Don A. Taylor, Box 4, Wadsworth, Ohio 44281, and Victor E. Buehrle, 365 Nye Dr., Akron, Ohio 44313

Filed Apr. 14, 1976, Ser. No. 676,727
Int. Cl.² B29H *17/36*
U.S. Cl. 156—129 **7 Claims**



1. A method of continuously applying preformed, uncured, blank tread material to pre-formed toroidial tire casings and curing the same in curing apparatus having relatively movable mold sections, comprising the steps of:

A. continuously shaping the tread material and elevating the temperature thereof;

B. applying a suitable length of said tread material at its elevated temperature to the periphery of a first casing;

C. transferring said first casing and said tread material at its elevated temperature to the first of a succession of first curing apparatus and inserting it between the mold sections thereof;

D. inducing the necessary curing temperature in said first curing apparatus;

E. successively applying a suitable length of said tread material to the periphery of at least a second casing at its elevated temperature while said first casing is within said first curing apparatus;

F. transferring said second casing and said tread material at its elevated temperature to another of said curing apparatus;

G. inducing the necessary curing temperature in other curing apparatus;

H. successively removing said casings from said curing apparatus; and

I. repeating steps A through H so that said casings are transferred to said succession of curing apparatus while at their elevated temperatures and a plurality of casings are processed simultaneously with at least one of said curing apparatus being available to receive said casings as they are transferred thereto.

4,088,525

METHOD OF MAKING FIBER GLASS PARTS WITH STUD SUPPORTS

Michael Gowetski, Muncie, and Robert W. Smith, Marion, both of Ind., assignors to The General Tire & Rubber Company, Akron, Ohio

Filed Aug. 12, 1976, Ser. No. 713,757
Int. Cl.² B29D *3/02*; B29C *5/00*
U.S. Cl. 156—173 **1 Claim**

1. A method of forming and curing in a mold cavity, a glass fiber reinforced plastic part having stud supports molded into the part which comprises:

(a) forming a continuous filament glass fiber cylinder impregnated with a heat curable resin,

(b) forming said glass fiber cylinder to fit between a pin and a wall which form a recess which subsequently forms the stud supports, and inserting the cylinder into the recess,

(c) placing in the mold cavity additional flowable heat curable said resin containing chopped glass fiber; and

(d) applying heat and pressure to cause the chopped glass fiber and resin to flow and fill the mold including space surrounding said cylinder, and

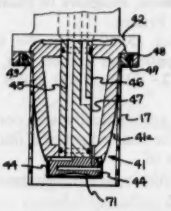
(e) curing said resin.

4,088,526

APPARATUS FOR FABRICATING THERMOPLASTIC CONTAINERS

Stephen W. Amberg, Toledo, Ohio, and Thomas E. Doherty, Setauket, N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 479,421, Jun. 14, 1974, Pat. No. 3,970,492, which is a continuation-in-part of Ser. No. 354,305, Apr. 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 211,259, Dec. 23, 1971, Pat. No. 3,854,583. This application May 5, 1976, Ser. No. 683,466
Int. Cl.² B29D *23/10*
U.S. Cl. 156—446 **39 Claims**



1. An apparatus for fabricating cup-like containers from a plurality of thermoplastic webs comprising: continuously moving conveyor means defining a closed operational path; forming mandrels having outer side and bottom surfaces contoured to the configuration of the desired inner surface of said con-

tainer; means rotatably mounting said mandrels on said conveyor means for movement along said path; a plurality of means adjacently disposed at spaced intervals along said path and cooperating with said mandrels to form said containers, including, in order, means for preheating said mandrels; means for rotating said mandrels as said mandrels are conveyed past said preheating means, thereby to uniformly thermalize the mandrels; means for cutting rectangular blanks from a first given heat-shrinkable web; means for joining the ends of said first web blanks to form cylindrical sleeves; means for transferring said cylindrical sleeves to said mandrels as said mandrels move in register with said end joining means; means for cutting discs simultaneously from second and third given webs, said discs being formed to provide bottom closures for said containers; means for serially transferring said discs to said mandrels; means for heat-shrinking said cylindrical sleeves to the side contour of said mandrel; means for rotating said mandrels during their movement past said shrinking means, thereby to uniformly shrink said cylindrical blank; sealing means cooperating with said mandrels for joining said discs to said shrunken cylindrical sleeve to form a liquid-tight container as said mandrels move in register with said sealing means; rimming means for forming a rim on said container; and means for transferring said containers from said mandrels to said rimming means.

4,088,527

APPARATUS FOR SPLICING SHEET MATERIAL

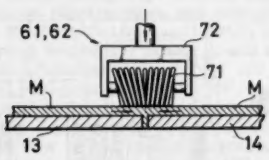
Yoshitaka Murase, Hiratsuka; Noboru Okada, Fujisawa; Iwashiro Yoshikawa, Tokyo; Tsutomu Takeuchi, Isehara, and Hisakuni Yamashita, Chigasaki, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed May 24, 1976, Ser. No. 689,017

Claims priority, application Japan, Jul. 8, 1975, 50-83097

Int. Cl.[2] B31F *5/00*

U.S. Cl. 156—502 **7 Claims**



1. Apparatus for joining pieces of sheet material end to end comprising, in combination:

(a) a pair of tables disposed in coplanar relationship to each other and having edges arranged opposite to each other in parallel relationship, said tables being adapted to hold thereon the pieces of sheet material to be joined;

(b) retractable stop means movable between a retracted and an operable stop position, said stop means in said operable stop position being spaced predetermined distances from the edges of said tables respectively;

(c) a pair of clamps arranged over said tables respectively;

(d) means for actuating said clamps for causing same to clamp the pieces of sheet material on said tables respectively and to release the pieces by retracting away from said tables;

(e) readjusting means carried by said clamps, said readjusting means being operable to urge the opposed ends of the pieces of sheet material into neat contact with said retractable stop means while said clamps are being moved from said retracted to said working position such that the pieces of sheet material are thereby positioned on the tables with their opposed edges projecting said predetermined distances beyond said edges of said tables before the clamping is effected by said clamps;

(f) means for relatively moving said tables toward and away from each other, whereby the clamped pieces of sheet material on said tables are forced into end-to-end abutment and thus preliminarily joined together when said tables are moved toward each other; and

(g) finishing means including at least one finishing roller adapted to roll over the preliminarily formed joint of the pieces of sheet material on said tables for both smoothing and strengthening the joint.

4,088,528

METHOD AND APPARATUS FOR GRINDING CHIPS INTO PAPER PULP

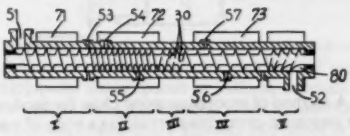
Pierre Berger, 5, rue Alphonse Merrheim, 42100 Saint-Etienne; Christian de Choudens, 1, rue des Martinets, 38160 Gieres; Gerard Lombardo, 151, Blvd. Joliot Curie, 38600 Fontaine, and Pierre Monzie, 16, Blvd. Marechal Leclerc, 38000 Grenoble, all of France

Filed Jul. 27, 1976, Ser. No. 709,193

Claims priority, application France, Jul. 31, 1975, 75 23911

Int. Cl.[2] D21B *1/16, 1/34;* D21C *3/24*

U.S. Cl. 162—19 **8 Claims**



1. A process for producing paper pulp comprising subjecting a material initially reduced to chips to a mechanical grinding treatment by the combined actin of compression and shear forces, wherein the mechanical grinding treatment from the state of chips up to the state of paper pulp is effected continuously by passing the material between at least two substantially parallel helicoidal screw surfaces penetrating one into the other and driven in synchronous rotation in the same direction in the interior of a casing which surrounds them, said helicoidal surfaces forming successive upstream feed and downstream grinding zones, the chips being introduced in the upstream zone and being driven towards the downstream zone by the rotation of the screws, braking the advance of material into said downstream zone to produce high compression thereat tending to return the material in the opposite direction by forming the threads of the screws in the downstream zone with a reverse pitch from that in the upstream zone, selectively advancing the compressed material downstream in said downstream zone proportional to the degree of grinding thereof by forming apertures constituting windows in the reverse threads in the downstream zone, regulating the temperature in at least one zone by controlled heat exchange along the length of the casing, and discharging the produced pulp through an orifice in the downstream zone.

7. A machine for fabrication of paper pulp comprising at least two shafts substantially parallel to one another and having helicoidal surfaces penetrating one into the other, a casing surrounding said surfaces, means for driving the shafts in synchronized rotation in the same direction, said casing being provided at one extremity with an orifice for introduction of material in the form of chips and at the other extremity with a discharge orifice for material advanced by the rotation of the helicoidal surfaces, said helicoidal surfaces having threads defining from upstream to downstream a succession of drive zones for advance of the material by meshing of the helicoidal surfaces and intermediate brakage zones separating successive drive zones, said helicoidal surfaces in said brakage zones having a reverse thread compared to said drive zones and tending to drive the material in reverse direction, said helicoidal surfaces in said brakage zones being provided with windows for the passage of the material downstream, said casing being provided with orifices for introduction of fluid downstream of the brakage zones and discharge orifices for fluid upstream of the brakage zones, said machine further compris-

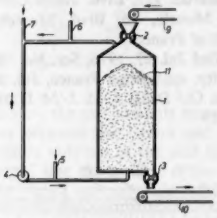
ing regulation chambers for adjusting the temperature in successive zones distributed along the casing.

4,088,529

METHOD OF RESIN SEASONING WOOD CHIPS

Jens Olov Ryhman, and Nils Anton Vogt, both of Saffle, Sweden, assignors to Billeruds Aktiebolag, Billerud, Sweden

Filed Nov. 12, 1975, Ser. No. 631,309
Claims priority, application Sweden, Dec. 10, 1974, 7415430
Int. Cl.[2] D21C *1/08*
U.S. Cl. 162—65 7 Claims



1. A method of processing wood chips for producing a rapid resin seasoning, comprising providing a body of wood chips in a container which is substantially closed to the atmosphere, maintaining a temperature of 35° - 80° C in said container, maintaining a forced movement of air having an oxygen content of at least 16% by volume in said container to produce a biochemical oxidation at a uniform temperature and oxygen content in said container, withdrawing part of said moving air, substituting fresh air for a portion of said withdrawn air to form an oxygen enriched gaseous mixture, and reintroducing said oxygen enriched gaseous mixture into said container.

4,088,530

DRY STRENGTH PAPER AND PROCESS THEREFOR

Lock-Lim Chan, Whitby, and Joseph Francis Schaffer, Toronto, both of Canada, assignors to Borden Products Limited, West Hill, Canada

Continuation of Ser. No. 537,252, Dec. 30, 1974, abandoned. This application May 6, 1976, Ser. No. 683,581
Claims priority, application Canada, Nov. 5, 1974, 213060
Int. Cl.[2] D21H *3/48*
U.S. Cl. 162—168 NA 10 Claims

1. Process for the manufacture of paper of improved dry strength and negligible wet strength without the use of a buffer and without a water-soluble non-thermosetting cationic resin comprising the steps of forming an aqueous suspension at pH of about 5 to 7 of paper making fibers containing a dry strength additive and a fixing agent selected from the group consisting of polyvalent metal salts and mixtures thereof, and sheeting the suspension to form the paper, the additive consisting essentially of a copolymer of acrylamide and maleic acid or its anhydride in respective mol ratio of from 90:10 to 98:2 which is used in sufficient amount to impart to the paper improved dry strength and negligible wet strength whereas the salt is used in sufficient amount to affix the copolymer to the fibers.

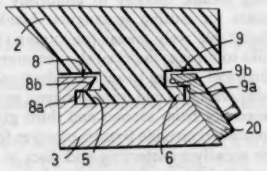
4,088,531

DEWATERING DEVICE FOR THE WIRE SECTION OF A PAPER OR BOARD MACHINE

Veikko Lamminen, Tampere, Finland, assignor to Oy Tampella Ab, Tampere, Finland

Filed Feb. 14, 1977, Ser. No. 768,455
Claims priority, application Finland, Feb. 25, 1976, 760493
Int. Cl.[2] D21F *1/54*
U.S. Cl. 162—352 4 Claims

1. A dewatering device for the wire section of a paper or board machine, said device comprising a dewatering blade located below said wire and transversely of the direction of movement thereof and a rail supporting the blade, said blade and rail being slidably connected to each other by a joint incorporating two guide ways formed respectively in said blade and said rail and extending transversely of the wire, the



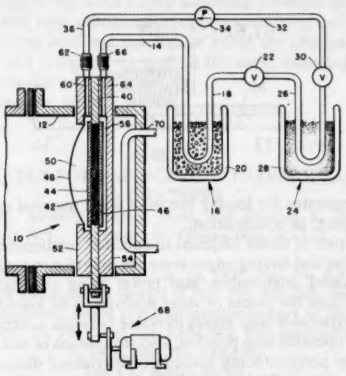
guide way of the blade comprising two projections and the guide way of the rail comprising two grooves, at least one of said grooves being a combined T-and fishtail groove having a T-groove surface and a fishtail groove surface, said surfaces forming an obtuse included angle.

4,088,532

TARGETS FOR PRODUCING HIGH PURITY ^{123}I

James W. Blue, Bay Village, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 266,927, Jun. 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 863,280, Oct. 2, 1969, Pat. No. 3,694,313. This application Sep. 4, 1973, Ser. No. 394,207
Int. Cl.[2] G21G *1/10*
U.S. Cl. 176—11 2 Claims



1. A method of producing high purity ^{123}I with a cyclotron as a source of a He^3 beam of energy up to 50 MEV comprising the steps of

moving powders of an isotope from a group consisting of ^{122}Te and ^{123}Te into and out of said beam,

bombarding said powders in said beam with the He^3 beam to produce ^{123}Xe whereby the powders are heated and a portion thereof is vaporized,

condensing the vaporized isotope on the powders out of the beam, whereby the condensed isotope and powders are moved back into said He^3 beam so that the same are again bombarded to produce ^{123}Xe,

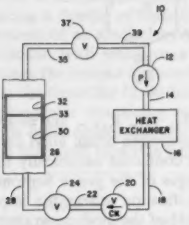
passing helium through said powders to remove ^{123}Xe and iodine contaminants therefrom, and

sequentially freezing out the iodine contaminants and ^{123}Xe from said helium.

4,088,533
RADIONUCLIDE TRAP

Joseph C. McGuire, Richland, Wash., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 18, 1977, Ser. No. 760,301
Int. Cl.[2] G21C *19/30*
U.S. Cl. 176—37 **4 Claims**



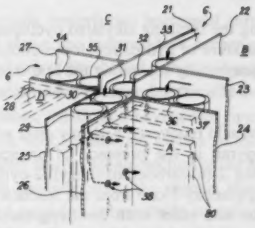
1. In a nuclear reactor employing a liquid coolant stream in a liquid coolant circuit for transferring heat from nuclear reactor fuel pins located in reactor fuel element subassemblies to a heat exchanging means, an apparatus for chemically removing radionuclides manganese-**54**, cobalt-**58**, and cobalt-**60** from said nuclear reactor coolant stream comprising a center support member; a generally rectangular nickel sheet having a plurality of diagonally disposed, generally parallel grooves in a surface thereof and elongated, raised portions on the opposite surface of said sheet coextensive with said parallel grooves, said nickel sheet being convoluted about said center support member in a spiral manner effectively forming a plurality of concentric sheet layers about said support member, said raised portions of said sheet separating adjacent sheet layers and forming elongated arcuate helical passageways between adjacent sheet layers and adjacent raised portions, said passageways being simultaneously spirally spaced from and helically wound along said center support member for passage of said coolant past said nickel sheet in turbulent fashion through said spirally and helically wound passageways and deposition of said radionuclides on said sheet surfaces; end portions of said convoluted nickel sheet being disposed in the path of said liquid coolant stream to effect flow of said coolant longitudinally of said convolutions and removal of said radionuclides manganese-**54**, cobalt-**58** and cobalt-**60** from said nuclear reactor liquid coolant stream onto said nickel sheet wherein said elongated arcuate helical and spiral passageways are of greater length than the distance between said end portions of said convoluted nickel sheet to achieve maximum removal of said radionuclides within minimal space.

4,088,534
CASING FOR THE FUEL ELEMENTS OF A WATER-COOLED NUCLEAR REACTOR

Jean-Louis Andrieu, Paris, and Jacques Delafosse, Gif-sur-Yvette, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed May 26, 1976, Ser. No. 690,183
Claims priority, application France, Jun. 4, 1975, 75 17468
Int. Cl.[2] G21C *9/00*
U.S. Cl. 176—38 **3 Claims**

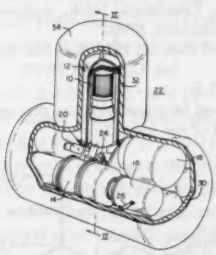
1. In a water-cooled nuclear reactor having a casing for said reactor, spaced walls for said casing, a plurality of identical compartments of parallelopipedal shape in said casing, bundles of fuel elements vertically disposed in said compartments, control rods for the nuclear reactor, means for guiding said control rods in said spaced walls of said casing, means for supplying emergency coolant between said spaced walls of said casing, measuring devices for said reactor, and means for positioning said measuring device in said spaced walls of said casing, the improvement comprising said spaced casing walls being two spaced parallel metal sheets of small thickness, stiffening webs welded at intervals to and between said sheets, said webs extending between said two metal sheets to the full height of the casing and parallel to the axis of the reactor, said webs including flat arrays of vertical and tangent tubes welded in a sandwich arrangement between said two flat metal sheets, a plurality of said vertical and tangent tubes being apertured along the generating line of contact between said tubes and said flat sheets establishing communication between the interior of said tubes and the internal space of the casing compartments, and also said webs including solid metal bars of rectangular parallelopipedal shape spaced at uniform intervals and defining between said two parallel metal sheets of small thickness parallelopipedal free spaces, a plurality of orifices in said metal sheets spaced at intervals over the entire surface of said sheets for communication between said free spaces and the adjacent compartments of said casing.



4,088,535
MOBILE NUCLEAR REACTOR CONTAINMENT VESSEL

Robert E. Thompson, Bethel Park; Francis R. Spurrier, Pittsburgh, and Andrew R. Jones, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 592,856, Jul. 2, 1975, abandoned. This application Feb. 9, 1977, Ser. No. 767,184
Int. Cl.[2] G21C *13/00*
U.S. Cl. 176—87 **6 Claims**



1. A containment vessel for use with mobile nuclear reactor systems, said containment vessel enclosing the nuclear reactor primary system, said containment vessel being disposed within a lightweight, high speed ship, said containment vessel comprising:

a horizontal cylinder; and

a vertical cylinder hermetically secured to said horizontal cylinder intermediate the ends of said horizontal cylinder, said vertical cylinder extending vertically upward from said horizontal cylinder, said vertical cylinder and said horizontal cylinder forming a generally inverted T,

said containment vessel being made of a material having a thickness such as to withstand external forces imposed on said containment vessel of a magnitude substantially equal to the forces exerted by water at a depth of twelve hundred feet below sea level.

4,088,536

METHOD FOR PREPARING PROSTAGLANDINS

Charles J. Sih, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Division of Ser. No. 221,058, Jan. 26, 1972, Pat. No. 4,031,129. This application Feb. 25, 1977, Ser. No. 772,019
Int. Cl.[2] C12D *1/02*
U.S. Cl. 195—30 1 Claim

1. A method for preparing PGE_1 which comprises:
alkylating lithium cyclopentadiene with ethyl-7-bromo-heptanoate
oxygenating the resulting alkylated cyclopentadiene to produce a mixture of hydroxycyclopentenones
chromatographically separating the said mixture and recovering 2-(6′-carboethoxyhexyl)-4-hydroxy-cyclopenten-1-one
reacting the said recovered hydroxy ester with an excess of dihydropyran in the presence of an acid catalyst and recovering 2-(6′-carboethoxyhexyl)-2-cyclopentene-4-tetrahydropyranoxy-1-one from the reaction mixture
reacting the said ether with the oxygenated vinyl lithium derivative obtained from the reaction of lithium powder and 3-(α-ethoxy)-ethoxy-1-iodo-trans-1-octene in the presence of tri-n-butylphosphine-copper iodide complex and recovering the formed prostanoic acid derivative from the reaction mixture
removing the tetrahydropyranyl and ethoxy-ethoxy ether groups from the said derivative
chromatographically recovering PGE_1 ethyl ester from the reaction mixture and
exposing the said ester to the action of an esterase-producing microorganism and recovering PGE_1 from the reaction mixture.

4,088,537

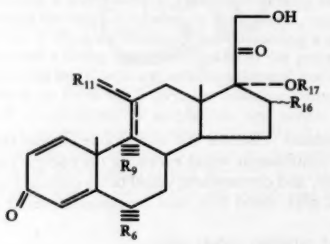
Δ[1] DEHYDROGENATION OF CORTICOIDS WITHOUT SIDE CHAIN DEGRADATION BY SEPTOMYXA

James P. Rolls, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jun. 21, 1976, Ser. No. 698,060
Int. Cl.[2] C07B *29/02*
U.S. Cl. 195—51 E 14 Claims

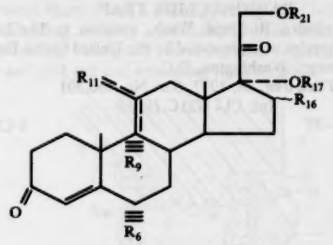
1. An improved biotransformation process for the production of a steroid of the formula:

XX



where R_6 is a hydrogen or fluorine atom or methyl group; where R_9 when present is a hydrogen, fluorine, chlorine, or bromine atom, or hydroxyl group; where R_{11} is (H), (H,H) (H,αOH), (H,βOH), or (O); where R_{16} is a hydrogen atom or methyl group; where R_{17} is alkyl carboxylate of 2 thru 6 carbon atoms, aromatic carboxylate of 7 thru 12 carbon atoms, where ~ indicates the attachment of the R_{16} group in the alpha or beta configuration; and where =-is a single or double bond where a compound of the formula:

XXI



where R_6, R_9, R_{11}, R_{16}, R_{17}, ~ and =-are defined above and where R_{21} is a hydrogen atom, alkyl carboxylate of 2 thru 6 carbon atoms is contacted aerobically in a fermentation medium with a fungus of the genus Septomyxa followed by extraction and purification where the improvement comprises controlling the pH of the medium so that the pH is controlled and does not exceed 7.0.

4,088,538

REVERSIBLY PRECIPITABLE IMMOBILIZED ENZYME COMPLEX AND A METHOD FOR ITS USE

Michel Schneider, Grand-Lancy, Switzerland, assignor to Battelle Memorial Institute, Switzerland

Filed May 26, 1976, Ser. No. 690,096
Claims priority, application Switzerland, May 30, 1975, 6965/75
Int. Cl.[2] C07G *7/02;* C08F *216/34, 220/06;* C12D *13/02*
U.S. Cl. 195—63 10 Claims

1. A process for the enzymatic processing of a substrate which is subject to enzymatic action using a reversibly precipitable enzymatically active polymer-enzyme product, said product being an enzyme covalently bound to a water-soluble organic polymer selected from the group consisting of polyacrylic acid, water-soluble derivatives thereof, dextran, carboxymethylcellulose and polyethylene glycol and having side groups for reversible flocculation in aqueous media, comprising the steps wherein the said polymer-enzyme product is maintained in dissolved state, in an aqueous solution of the said substrate as reaction medium for a period and at a temperature sufficient to achieve the desired degree of enzymatic reaction, and then precipitating and separating the polymer-enzyme product from the reaction medium.

2. A reversibly precipitable enzymatically active water-soluble polymer-enzyme product wherein the enzyme is covalently bound to a water-soluble organic polymer consisting of macromolecular chains selected from the group consisting of polyacrylic acid, water-soluble derivatives thereof, dextran, carboxymethylcellulose and polyethylene-glycol, said macromolecular chains being covalently bound to side groups which impart to said polymer-enzyme product the property of reversibly precipitating or flocculating in aqueous media as a result of the variation of at least one physico-chemical parameter of said medium or by addition of bivalent or trivalene metallic ions to said medium.

4,088,539

PROCESS OF MANUFACTURING ENZYME PREPARATION RICH IN LIPASE

Klaus Peter Müller, Bergheim, Germany, assignor to A. Nattermann & Cie GmbH, Cologne, Germany

Filed May 3, 1977, Ser. No. 793,322
Claims priority, application Germany, May 7, 1976, 2620289; Apr. 15, 1977, 2716719
Int. Cl.[2] C07G *7/026*
U.S. Cl. 195—66 R 4 Claims

1. In a process of manufacturing enzyme preparations rich in lipase from pancreas tissue through autolysis and degreasing of the comminuted tissue by means of a solvent mixture consisting

of hydrocarbon and alcohol as well as precipitation of the enzyme from the aqueous phase through addition of acetone and drying of the precipitate, the improvement wherein

the comminuted pancreas tissue is mixed in an organic solvent-mixture consisting of 80–95 volume percent of (a) a halogenated hydrocarbon, whose boiling point at normal pressure is between 47° and about 130° C and whose density amounts to more than 1.3, or (b) a hydrocarbon, whose boiling point at normal pressure is between 47° and about 130° C having a density of from 0.655 to 0.88, and 5–20 volume percent of an alcohol having 4–6 C atoms which is not miscible with water or a mixture of said alcohol and acetone, the solvent mixture being allowed to exert its effect on the tissue for 12–40 hours at 15°–20° C, the obtained tissue-water containing emulsion phase is separated from the other phases and a dry enzyme-preparation is obtained from said emulsion phase.

4,088,540

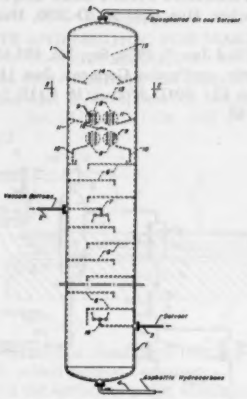
SOLVENT DEASPHALTING APPARATUS

Bennie I. Bunas, Chicago, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 5, 1976, Ser. No. 739,219

Int. Cl.² B01D *11/04;* **C10G** *21/14, 43/12*

U.S. Cl. 196—14.52 **3 Claims**



1. An apparatus useful for solvent deasphalting black oils which comprises:

(a) a vertically oriented vessel having an internal volume formed by a cylindrical side wall which has an internal surface, the vessel being divided into an upper section and a lower section and having upper and lower ends;

(b) a solvent inlet means communicating with the internal volume of the vessel at a first point in the lower section of the vessel and above the lower end of the vessel;

(c) a charge stock inlet means communicating with the internal volume of the vessel at a higher second point in the vessel;

(d) a first plurality of vertically spaced apart and substantially horizontal liquid-liquid contacting trays located within the vessel above the solvent inlet means and below the charge stock inlet means;

(e) an indirect heat exchange means located in the upper section of the vessel above the charge stock inlet means and comprising a first and a second bundle of horizontal U-shaped heat exchange tubes which extend across the internal volume of the vessel, each bundle passing through the side wall at only one point, with this point being on the opposite side of the vessel from the point at which the other bundle passes through the side wall and at the same vertical elevation, the two bundles being positioned adjacent each other;

(f) a second plurality of vertically spaced apart and substantially horizontal liquid-liquid contacting trays located within the vessel above the charge stock inlet means and below the indirect heat exchange means;

(g) a first liquid outlet means communicating with the internal volume of the vessel at the upper end of the vessel, and a second liquid outlet means communicating with the internal volume of the vessel at the lower end of the vessel;

(h) a substantially imperforate horizontal shroud operably positioned above the indirect heat exchange means, the longitudinal axis of the shroud being in alignment with the longitudinal axis of the first and the second bundles of heat exchange tubes, the shroud having two opposing curved edges which abut the internal surface of the side wall at points directly above the intersection of the heat exchange means with the side wall, the shroud also having two parallel and opposing substantially straight edges which extend between the curved edge, with the straight edges being separated by a distance greater than the combined width of the two heat exchange bundles, and thereby providing for vertical liquid flow two opposing chordal openings in the cross-section of the vessel defined by the straight edges of the shroud and the internal surface of the side wall;

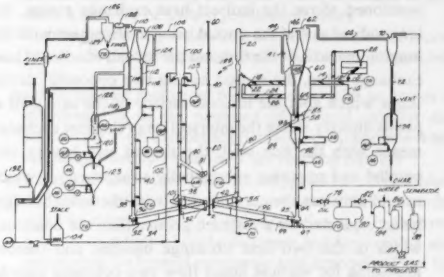
(i) a first pair of chordal liquid baffle plates located within the vessel above the shroud, the first pair of plates being operably positioned on opposing sides of the side wall at points directly above the two chordal openings in the cross-section of the vessel defined by the shroud, with each baffle plate having a curved edge which abuts the internal surface of the side wall and a straight edge which is parallel to the straight edges of the shroud, the vertical distance between the first pair of baffle plates and the upper end of the vessel being greater than the radius of the vessel, with the internal volume of the vessel above the first pair of baffle plates being devoid of structural components which extend across the cross-section of the vessel; and,

(j) a second pair of chordal liquid baffle plates located within the vessel, the second pair of plates being operably positioned on opposing sides of the side wall at points directly below the two chordal openings in the cross-section of the vessel defined by the shroud, each baffle plate having a curved edge which abuts the internal surface of the side wall and a straight edge which is parallel to the straight edges of the shroud, the straight edge of each baffle plate being located below a horizontal centerline through the first and second bundle heat exchange tubes, whereby a stream of solvent may be fed to the lower section of the vessel through the solvent inlet means to countercurrently contact a black oil stream charged through the charge stock inlet means in the first plurality of contacting trays and then to countercurrently contact a second liquid phase in the second plurality of contacting trays, with the resulting extract stream being caused to pass upward through the heat exchange means by the action of the second pair of baffle plates and admixed to a uniform temperature by the action of the shroud and the first pair of baffle plates, with the extract stream then being retained within a quiescent settling zone above the first pair of baffle plates before being discharged from the vessel.

4,088,541
APPARATUS FOR PYROLYZING ORGANIC SOLID WASTE

Charles K. Choi, Claremont; Richard M. Gundzik, Placentia, and Joseph P. Tassoney, Diamond Bar, all of Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 603,876, Aug. 11, 1975, abandoned. This application Aug. 31, 1976, Ser. No. 719,271
Int. Cl.[2] C10B *49/16*
U.S. Cl. 202—99 **14 Claims**

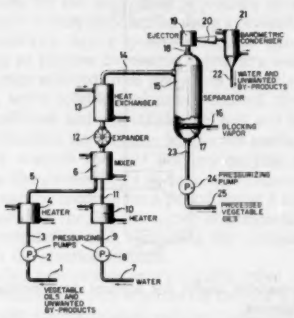


1. Apparatus for pyrolyzing organic solid waste comprising:
(a) a transport pyrolysis reactor providing a first inlet for receiving particulate organic solid waste and a second inlet for receiving a particulate source of heat selected from the group consisting of a carbon containing solid residue of pyrolysis, an inorganic heat source formed by decarbonization of the carbon containing solid residue of pyrolysis, and mixtures thereof adjacent one end of the transport pyrolysis reactor and an outlet for the products of pyrolysis adjacent the opposed end of said transport pyrolysis reactor;
(b) means for passing particulate organic solid waste into the first inlet of said transport pyrolysis reactor and means for passing the particulate source of heat in a nondeleteriously reactive transport gas into the second inlet of said transport pyrolysis reactor for combination and passage with the particulate organic solid waste through the transport pyrolysis reactor under turbulent flow conditions for a time sufficient to pyrolyze the organic solid waste to yield the carbon containing solid residue of pyrolysis, pyrolytic oils, and gases at a given pressure at the second inlet of the transport pyrolysis reactor;
(c) means for separating the particulate source of heat and carbon containing solid residue of pyrolysis from the pyrolytic oils and gases exiting the outlet of the transport pyrolysis reactor;
(d) a first collection vessel providing an outlet at the base thereof for collection of the particulate source of heat and carbon containing solid residue of pyrolysis;
(e) means for depositing the separated particulate source of heat and carbon containing solid residue of pyrolysis in the first collection vessel;
(f) a burner having an inlet for receiving the carbon containing solid residue of pyrolysis and particulate source of heat from the first collection vessel;
(g) a first transport conduit connected from the outlet of the first collection vessel to the inlet of the burner;
(h) means for introducing a transport gas into the first transport conduit to transport the separated particulate source of heat and carbon containing solid residue of pyrolysis from the first collection vessel to the burner;
(i) means for passing the separated particulate source of heat and carbon containing solid residue of pyrolysis through the burner, at a given burner inlet pressure, in the presence of a gaseous source of oxygen for a time sufficient to form the particulate source of heat by at least partial decarbonization of the carbon containing solid residue of pyrolysis for passage to the pyrolysis reactor;
(j) a second collection vessel providing an outlet at the base thereof;
(k) means for depositing at least a portion of the formed particulate source of heat in the second collection vessel;
(l) a second transport conduit connected from the outlet of the second collection vessel to the second inlet of the pyrolysis reactor;
(m) means for introducing the nondeleteriously reactive transport gas into the second transport conduit to transport the particulate source of heat from the second collection vessel to the pyrolysis reactor;
(n) first means for establishing a higher pressure at the outlet of the first collection vessel than the given pressure at the inlet to the burner to prevent reverse flow through the connecting transport conduit; and
(o) second means for establishing a higher pressure at the outlet of the second collection vessel than the given pressure at the second inlet of the pyrolysis reactor to prevent reverse flow through the connecting transport conduit.

4,088,542
METHOD OF AND DEVICE FOR SPONTANEOUSLY DISTILLING OFF SECONDARY SUBSTANCES ESPECIALLY FROM OILY LIQUIDS

Heinz Schumacher, Hoperfeld 26, D-2050, Hamburg 80, Germany

Filed Jun. 7, 1976, Ser. No. 693,651
Claims priority, application Germany, Jun. 11, 1975, 2525976
Int. Cl.[2] B01D *3/06, 3/38;* C11B *3/14*
U.S. Cl. 203—88 **5 Claims**



1. A method of spontaneously distilling off unwanted by-products from vegetable oils, by means of superheated steam which is utilized to lower the boiling points of the by-products to be removed, the method comprising introducing said steam into a contact vessel containing said oils at a high mixing temperature and pressure, said steam being substantially at the same pressure and at somewhat higher temperature than said oils, such that said stream shock condenses upon entering said contact vessel and dissolves in said oils, forming a true, molecular solution therewith, and then suddenly reducing the pressure of said solution thereby causing said steam, with said by-products, to be stripped from said solution in a vapor state.

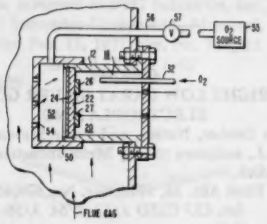
4,088,543
TECHNIQUE FOR PROTECTING SENSING ELECTRODES IN SULFIDING ENVIRONMENTS

Roswell J. Ruka, Churchill Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 10, 1976, Ser. No. 722,259
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—1 T **1 Claim**

1. A method of protecting the sensing electrode of an oxy-

gen sensing solid electrolyte electrochemical cell from the deteriorating affects of a reducing atmosphere of a gas environment contacting said sensing electrode, said cell developing an EMF signal indicative of the oxygen content of said gas environment, comprising the steps of,



intermittently measuring the EMF signal as an indication of the oxygen content of the gas environment, and, between said intermittent measurements,

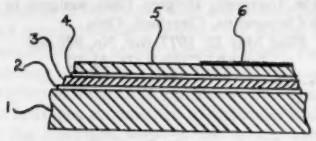
protecting the sensing electrode by maintaining an oxidizing atmosphere in the gas environment in response to said EMF signal.

4,088,544

COMPOSITE AND METHOD FOR MAKING THIN COPPER FOIL

Irving J. Hutkin, 5284 Stonecourt, San Diego, Calif. 92123

Filed Apr. 19, 1976, Ser. No. 678,197
Int. Cl.² C25D *1/04, 1/22*
U.S. Cl. 204—12 **17 Claims**



1. An improved method of making a thin, substantially pore-free copper foil, which method comprises:

a. disposing on the surface of a thin aluminum metal carrier a thin layer of zinc or tin;

b. disposing on said layer of zinc or tin a thin chromium release layer containing a plurality of plating sites;

c. depositing a copper layer on said release layer to form a thin, substantially pore-free copper foil;

d. bonding the exposed face of said copper foil to a substrate to form a laminate; and

e. separating said release layer from said foil.

4,088,545

METHOD OF FABRICATING MASK-OVER-COPPER PRINTED CIRCUIT BOARDS

Fred L. Supnet, 1185 Autumnsong Way, San Jose, Calif. 95100

Filed Jan. 31, 1977, Ser. No. 763,873
Int. Cl.² C25D *5/02, 5/54*
U.S. Cl. 204—15 **17 Claims**

1. A method of fabricating a mask-over-copper printed circuit board having circuit connections on both sides thereof and a solder mask covering portions of at least one side thereof, from a laminate of insulating board material having an electrically conductive coating of copper extending across and laminated to each of the opposed first and second sides thereof, comprising the steps of

(a) piercing a desired pattern of holes completely through all three layers of said laminate;

(b) forming a desired circuit connection pattern of said laminate copper coating extending between selected said holes on said laminate first side by selective removal of undesired portions of said laminate first side copper coating;

(c) electrically connecting said laminate first side connection pattern by conductive metallic material deposited extending through said holes to said laminate second side copper coating extending across said laminate second side, whereby electrical continuity may be maintained among the various holes and connections by said second side copper coating;

(d) applying a solder mask to the areas of said first side copper connection pattern which are to be protected from solder during any subsequent fabrication soldering steps and then electroplating a protective metallic material to portions of the first side connection pattern copper material not covered by said solder mask and to desired portions of a circuit connection pattern on said second side copper coating while said laminate second side copper coating remains extending across said laminate second side; and

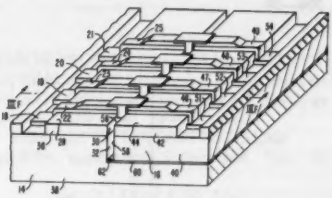
(e) removing the portions of said laminate second side copper coating outside said second side connection pattern, whereby may be produced a printed circuit board having connection patterns on both sides thereof and a solder mask over selected portions of at least the first side copper connection pattern.

4,088,546

METHOD OF ELECTROPLATING INTERCONNECTIONS

Shu-Yau Wu, Churchill Borough, Pa.; Nathan Bluzer, Silver Spring, Md.; Maurice H. Francombe, Pittsburgh, Pa., and Arthur S. Jensen, Baltimore City, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 1, 1977, Ser. No. 773,380
Int. Cl.² C25D *5/02;* **B01J** *17/00*
U.S. Cl. 204—15 **7 Claims**



1. A method for interconnecting contacts on different circuit components comprising the steps of:

positioning contacts at the edge of a first component,

positioning contacts at the edge of a second component,

positioning said edge of the first component in close proximity and spaced from said edge of the second component with contacts on said first component adjacent to contacts on said second component,

selectively depositing metal on said first and second components to interconnect predetermined contacts on said first component to a first electrode and to interconnect predetermined contacts on said second component to a second electrode,

selectively electroplating at a current density in the range from 0.1 amperes per centimeter squared to 1 ampere per centimeter squared metal on said predetermined contacts of said first and second components from a distance inside said edge of said first component to a distance inside said edge of said second component to form metalization paths which will span the distance from said predetermined contacts on said first component to said adjacent predetermined contacts on said second component, wherein the electroplated metalization on said predetermined contacts

grows towards each other faster from said predetermined contacts on said first component to said predetermined contacts on said second component than the metalization growth on the other exposed surfaces of said predetermined contacts and

removing portions of said selectively deposited metal to disconnect said predetermined contacts on said first component from the first electrode and to disconnect said predetermined contacts on said second component from said second electrode.

4,088,547

METHOD FOR PRODUCING A COATED METAL NODULAR SOLAR HEAT COLLECTOR

Clarence E. Albertson, Villa Park, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 1, 1976, Ser. No. 719,544
Int. Cl.[2] C25D *5/34, 5/10;* F24J *3/02*
U.S. Cl. 204—32 R **4 Claims**

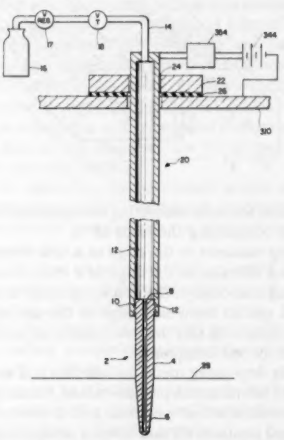
1. A method for making a solar heat collector comprising the steps of (1) cleaning a metallic substrate; (2) etching said substrate; (3) rinsing said substrate; (4) electrodepositing a metal on said substrate at a high current density to produce dendrite surfaces on said substrate; and (5) electrodepositing a black solar absorbing coating on said plated dendrite surfaces selected from the group consisting of black nickel and black chrome.

4,088,548

ELECTROLYTIC METHOD AND APPARATUS FOR REFRACTORY METALS USING A HOLLOW CARBON ELECTRODE

Douglas W. Townsend, 35 Front St., Mississauga, Ontario, Canada

Continuation-in-part of Ser. No. 656,871, Feb. 10, 1976, and a continuation-in-part of Ser. No. 360,467, Mar. 15, 1973, Pat. No. 3,979,267, said Ser. No. 656,871, is a division of Ser. No. 360,467,. This application Jul. 26, 1976, Ser. No. 708,739
Int. Cl.[2] C25D *3/66*
U.S. Cl. 204—39 **15 Claims**



1. For removing substantially all oxygen from an electrolytic melt consisting essentially of oxygen ions and at least one fluoride selected from the group consisting of alkali metal fluorides and alkaline earth metal fluorides, the process comprising the steps of:

(a) maintaining said melt above its melting temperature;

(b) providing a porous and hollow anode in said melt consisting essentially of carbon;

(c) maintaining the ambient pressure on said melt at less than one-third that within said anode and introducing an inert gas into the interior of said anode with a pressure gradient between the inside and outside of the anode sufficient to generate bubbles; and

(d) maintaining a positive potential on said anode relative to said melt sufficient to remove oxygen but less than the potential at which anode effect occurs.

4,088,549

BRIGHT LOW KARAT SILVER GOLD ELECTROPLATING

John Martin Deuber, Nutley, and Peter Stevens, Parsippany, both of N.J., assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Apr. 13, 1976, Ser. No. 676,439
Int. Cl.[2] C25D *3/62, 3/64, 3/56*
U.S. Cl. 204—43 G **8 Claims**

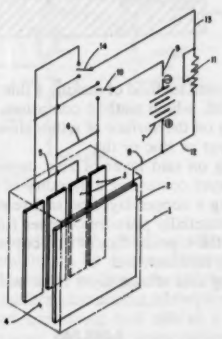
1. An aqueous alkaline electroplating bath having a pH within the range of about 9 to 11 and suitable for depositing silver-gold alloys comprising gold and silver in depositable form and containing as additional components about 0.001 to 0.1 g/l of a polyalkleneimine, and not more than about 5.0 g/l of an alkylene polyamine, whereby the bath is relatively stable, drag-out losses are minimized and fully bright deposits are obtained from said bath.

4,088,550

PERIODIC REMOVAL OF CATHODIC DEPOSITS BY INTERMITTENT REVERSAL OF THE POLARITY OF THE CATHODES

Irving Malkin, University Heights, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed May 25, 1977, Ser. No. 800,403
Int. Cl.[2] C25B *1/24, 15/02*
U.S. Cl. 204—95 **3 Claims**

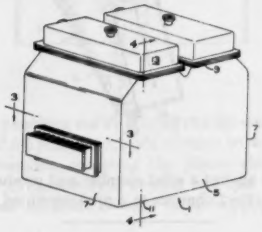


1. An electrolytic cell for electrolyzing impure saline solutions containing hardness impurities comprising a cell body, an inlet opening in said cell body for supplying electrolyte in the form of impure saline solution thereto, an outlet opening in said cell body for discharging spent electrolyte therefrom, at least one anode having a dimensionally stable coating thereon within said cell body, at least two cathodes within said cell body, a direct current power source operatively connected to said electrodes and switching means interposed between said power source and said cathodes whereby each such cathode can be made anodic selectively and sequentially so as to remove hardness deposits therefrom while continuing electrolysis with at least one cathode, said anode always remaining anodic during electrolysis so as not to damage the dimensionally stable coating thereon.

4,088,551
ELECTROLYTIC CELL AND METHOD OF ELECTROLYSIS

Carl W. Raetzch; Hugh Cunningham; William B. Darlington, all of Corpus Christi, Tex.; Richard J. Blanchfield; Michael A. Wolanyk, both of Chateauguay, and Robert Cote, Valleyfield, all of Canada, assignors to PPG Industries, Inc., Pittsburgh, Pa. and PPG Industries Canada Ltd., Montreal, Canada

Filed Feb. 15, 1977, Ser. No. 768,912
Int. Cl.² C25B 1/02
U.S. Cl. 204—129 2 Claims

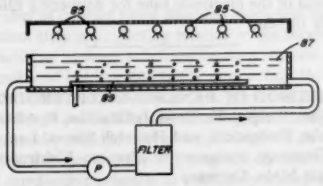


1. In a method of operating a bipolar electrolyzer having an individual bipolar unit with cathodes extending outwardly from a cathodic member thereof and facing the anodes of a prior adjacent cell in the electrolyzer and anodes extending outwardly from an anodic member on the opposite side thereof and facing cathodes of a subsequent adjacent cell in the electrolyzer which method comprises passing an electrical current from the anodes of the prior cell through an electrolyte to the said cathodes, evolving hydrogen on the cathodes and the cathodic member of the bipolar unit, and passing the electrical current and atomic hydrogen through the bipolar unit to the anodes mounted on the anodic member thereof, the improvement comprising providing a space between said cathodic and anodic members in the path of said atomic hydrogen whereby the atomic hydrogen is converted to molecular hydrogen and collecting the hydrogen between the anodic and cathodic members of the bipolar unit, removing the hydrogen through a closed hydrogen removal conduit means of electrolyte impermeable, hydrogen permeable material extending from the space between the anodic and cathodic members of the bipolar unit through the electrolyte outwardly of the bipolar unit.

4,088,552
RECOVERING SILVER COMPOUNDS FROM SOLUTIONS CONTAINING OTHER SILVER COMPOUNDS

Edward Dixon Morrison, and Chen-i Lu, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 19, 1976, Ser. No. 678,338
Int. Cl.² B01J 1/10
U.S. Cl. 204—157.1 R 5 Claims

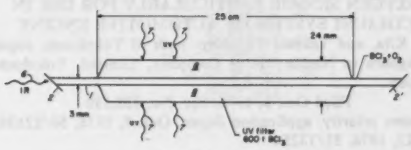


1. A method for rapidly precipitating silver in the form of a silver sulfide precipitate from an aqueous solution containing a silver thiosulfate complex, which method comprises subjecting said solution to radiation having an energy level of at least 4 electronvolts for a time sufficient to form a silver sulfide precipitate.

4,088,553
METHOD FOR SEPARATING BORON ISOTOPES

Stephen D. Rockwood, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 12, 1974, Ser. No. 478,560
Int. Cl.² B01J 1/10; B01K 1/00
U.S. Cl. 204—157.1 R 9 Claims



1. A method of separating isotopes of boron which comprises

(a) obtaining a gaseous mixture of BCl_3 containing both boron isotopes and a scavenger, said scavenger being substantially nonreactive with BCl_3 but highly reactive with photodissociation products of BCl_3,

(b) irradiating said mixture with radiation from the P or R branch lines of a CO_2 laser to preferentially excite those BCl_3 molecules containing a particular boron isotope,

(c) simultaneously irradiating said mixture with ultraviolet radiation at a wavelength which will photodissociate those BCl_3 molecules excited by said CO_2 laser radiation but not those BCl_3 molecules not excited by said CO_2 laser radiation, and

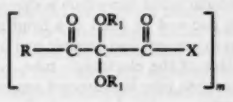
(d) separating undissociated BCl_3 from the reaction products of said photodissociation and said scavenger.

4,088,554
INITIATORS FOR PHOTOPOLYMERIZATION

Louis Felder, Basel; Rudolf Kirchmayr, Aesch, and Daniel Bellus, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 16, 1976, Ser. No. 751,305
Claims priority, application Switzerland, Dec. 23, 1975, 16701/75
Int. Cl.² C08F 8/00, 2/46
U.S. Cl. 204—159.15 15 Claims

1. In a method for the photo-polymerization of ethylemically unsaturated compounds, the improvement consisting substantially in the use as a photoinitiator of a compound of the formula I



I

in which m is 1 or 2,

R, when m is 1, denotes a phenyl radical which can be substituted by one or more of the groups: alkyl with 1–4 atoms, alkoxy or alkylthio with 1–4 C atoms, phenoxy, alkoxyalkyl with 2–4 C atoms, acylamino with 1–4 C atoms or halogen, or denotes a pyridyl radical and, when m is 2, represents phenylene,

R_1 represents alkyl with 1–6 C atoms, alkoxyalkyl with 3–6 C atoms, cycloalkyl with 5–7 C atoms, phenylalkyl with 7–9 C atoms, furfuryl, tetrahydrofurfuryl or phenyl, which can be substituted by one or more of the groups: alkyl with 1–4 C atoms, alkoxy or alkylthio with 1–4 C

atoms, alkoxyalkyl with 2–4 C atoms, halogen or acylamino with 1–4 C atoms,

X represents a group $—OR_2$ or $—N(R_3)(R_4)$, in which R_2 either represents one of the substituents mentioned for R_1 or is alkyl with 7–18 C atoms and R_3 and R_4 independently of one another represent hydrogen, alkyl with 1–4 C atoms, alkoxyalkyl with 3–6 C atoms or hydroxyalkyl with 2–4 C atoms.

4,088,555

OXYGEN SENSOR PARTICULARLY FOR USE IN EXHAUST SYSTEM OF AUTOMOTIVE ENGINE

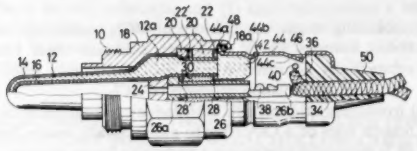
Toru Kita, and Takeshi Fujishiro, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Oct. 8, 1976, Ser. No. 731,110

Claims priority, application Japan, Oct. 9, 1975, 50/121362; Feb. 12, 1976, 51/13254

Int. Cl.² G01N *27/46*

U.S. Cl. 204—195 S **13 Claims**



1. In an oxygen sensor particularly for detecting oxygen concentration in the exhaust gas of an automotive internal combustion engine, the sensor having an ion conductive solid electrolyte tube which is closed at one end, first and second porous electrode layers respectively coated on the outer and inner surfaces of the electrolyte tube, a tubular metal shell enclosing therein the electrolyte layer partly such that a closed end portion of the electrolyte tube protrudes from the shell and that the first electrode layer is in contact with the inside of the shell, and a metal tube which is inserted into the bore of the electrolyte tube in contact with the second electrode layer and partially protrudes from the open end of the electrolyte tube thereby to serve both as a conductor and a conduit for admitting air as a reference gas into the interior of the electrolyte tube, the improvement comprising (a) an annular pad of an electrically nonconductive ceramic material which has an outer diameter larger than that of the open end of the electrolyte tube and an inner diameter smaller than that of the open end of the electrolyte tube but larger than the outer diameter of the metal tube and is arranged substantially coaxially with the electrolyte tube such that a front end face of the ceramic pad is in contact with and covers the open end face of the electrolyte tube, and (b) a tubular metal cap which is shaped to tightly sheathe said ceramic pad and so fixed at a front end portion thereof to the shell as to prevent said ceramic pad from parting from the open end face of the electrolyte tube, whereby the open end of the electrolyte tube is protected against access of a foreign matter thereto.

4,088,556

MONITORING MOVING PARTICLE ELECTRODES

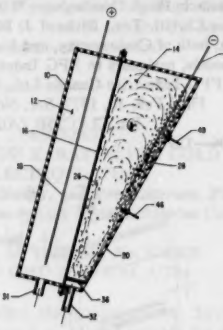
Alberto Pellegri, Luino (VA), and Rinaldo Santi, Milan, both of Italy, assignors to Diamond Shamrock Technologies, S.A., Geneva, Switzerland

Filed Sep. 21, 1977, Ser. No. 835,155

Int. Cl.² C25D *17/12*

U.S. Cl. 204—222 **18 Claims**

16. A method of monitoring the operation of an electrolytic cell having an electrode comprising a body of moving particles which comprises monitoring the impingement effect of elec-



trode particles against a solid member and producing a signal whenever the effect changes to a predetermined degree.

4,088,557

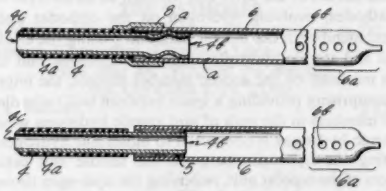
ELECTRODE ASSEMBLY AND MACHINE FOR SMALL-HOLE ELECTROCHEMICAL DRILLING

Laurance Richardson Andrews, Agawam, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jul. 1, 1977, Ser. No. 812,205

Int. Cl.² B23P *1/04*; C25D *21/06*; C25B *11/03*

U.S. Cl. 204—224 M **15 Claims**



1. An electrode assembly for use in electrochemical drilling, comprising:

(a) a metallic working electrode tube having an inlet end for receiving electrolyte and an outlet end for directing the electrolyte against the workpiece for drilling, the tube having preselected dimensions to produce the desired diameter and depth of hole in the workpiece;

(b) a filter tube, one end portion of which defines a plurality of individual access openings for entry of electrolyte from an electrolyte source, each access opening having a cross-section smaller than the bore of the electrode tube to prevent particles in the electrolyte capable of clogging the electrode tube from entering the assembly, and the other end of which is in sealed fluid communication with the inlet end of the electrode tube for delivering filtered electrolyte thereto.

4,088,558

METHOD OF RENEWING ELECTRODES

Peter Fabian, Freigericht; Ernst Jedlitschka, Bruchkobel; Helmut Krebs, Freigericht, and Heinrich Simon, Langenselbold, all of Germany, assignors to Heraeus Elektroden GmbH, Hanau am Main, Germany

Filed Sep. 16, 1977, Ser. No. 833,878

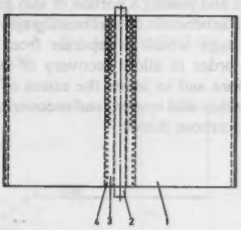
Claims priority, application Germany, Sep. 22, 1976, 2642559

Int. Cl.² C25B *11/02, 11/10*; B23P *7/00*

U.S. Cl. 204—288 **8 Claims**

1. A method of renewing electrode surfaces of metal elec-

trodes with an elongated supporting riser with at least the surface thereof being comprised of a valve metal or valve metal alloy supporting a generally planar electrode member with an electrocatalytic coating over at least a portion thereof



comprising punching out or drilling out the weld joint-producing points of the planar electrode member to remove the planar electrode member, recoating the planar electrode member with a new electrocatalytic coating and spot welding the recoated planar electrode member to the supporting riser.

4,088,559

HOLDING DEVICE FOR SMALL PARTS TO BE ELECTROPLATED

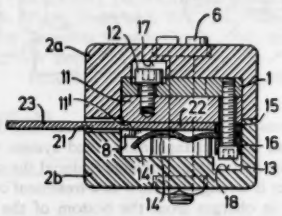
Willi Sandmeier, Luterbach, and Willi Uebelhart, Bellach, both of Switzerland, assignors to Sulzer Brothers Ltd., Winterthur, Switzerland

Filed Nov. 10, 1976, Ser. No. 740,654

Claims priority, application Switzerland, Nov. 11, 1975, 548/75

Int. Cl.² C25D *17/08*

U.S. Cl. 204—297 W **8 Claims**



1. A holding device for holding small parts to be electroplated, said holding device comprising

a contact bar adapted to be connected to a current source as a cathode;

a plurality of contact strips disposed along said bar with each contact strip in projecting relation to the surrounding area of said bar to form a defined contact surface, and

a plurality of holding means for connecting the parts to be electroplated to said contact bar, each said holding means including a resilient contact-making leaf-spring element of electrically conductive material disposed in facing relation to a respective contact strip and on said bar in electrical conductive relation to resiliently clamp a respective part between said element and a respective one of said contact strips, each said element being shaped to permit insertion and removal of a respective part between said element and said respective contact strip.

4,088,560

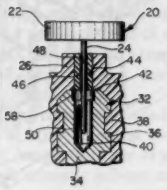
DEVICE FOR HOLDING AND MASKING POST-TYPE EARRINGS DURING THE COATING THEREOF

Robert L. Swinehart, Warwick, and Paul N. Patrick, Cranston, both of R.I., assignors to P.N. Patrick Company, Inc., Providence, R.I.

Filed Mar. 21, 1977, Ser. No. 779,708

Int. Cl.² C25D *17/08*

U.S. Cl. 204—297 W **8 Claims**



1. A plating rack for electroplating earrings of the type having an ornamental portion and a post extending therefrom and adapted to pass through a pierced ear opening, said rack comprising a plurality of devices adapted to receive and shield the post portion of said earrings and a support having an electrically insulated outer surface adapted for positioning said devices within an electroplating dip tank, each of said devices including a body of electrically insulative material, an electrically conductive insert disposed within said body and adapted to contact said support, said insert having a boss outwardly projecting from one end thereof for receipt in said support so as to provide electrical contact between said insert and said support, said body having an elongated bore extending inwardly thereof, a resilient member having a narrow generally centrally disposed elongated bore adapted to frictionally receive said earring post associated with said elongated bore, said post in free slidable contact with said member so that portions of said post are positioned within said elongated bore and those portions of said post extending into said narrow bore are masked from contact with plating solution, and electrically conductive spring means positioned within said elongated bore and in electrical contact with said insert, said spring means laterally engaging said post for assuring electrical contact between said post and said insert.

4,088,561

APPARATUS FOR ELECTROPHORESIS SEPARATION

Norman L. Anderson, Willowbrook, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 27, 1977, Ser. No. 810,443

Int. Cl.² G01N *27/26, 27/28*

U.S. Cl. 204—299 R **10 Claims**

1. An apparatus for slab-gel electrophoresis comprising:

a reservoir for containing a buffer solution;

first and second partitions, each having corresponding vertical slots from their top surfaces throughout a portion of their height, sealingly disposed in parallel along the length of the reservoir to form two outer and an inner parallel compartments, the vertical slots of each partition being in alignment with the slots of the other partition to form an array of opposing pairs of corresponding slots;

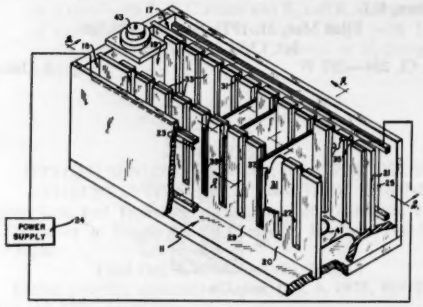
a plurality of slab-gel holders, each disposed in a pair of slots within the partitions, the holders having vertical edge portions with exposed slab-gel edges facing into the outer two reservoir compartments for contacting buffer solution;

a sample for electrophoresis placed at one of the exposed slab-gel edges;

electrically insulative sealing means interposed between the

vertical slots of the two partitions and the sample holders; and

electrode means within the two outer compartments for establishing a difference of electrical potential between



the buffer solutions within the two outer compartments to pass an electrical current for an electrophoresis separation of the sample from one vertical edge surface of a slab-gel to the opposite vertical edge surface.

4,088,562

METHOD AND APPARATUS FOR PROCESSING OIL SHALE

Joseph M. O'Ffill, Shawnee Mission, Kans., assignor to Twenty Farms, Inc., Kansas City, Mo.

Continuation-in-part of Ser. No. 633,541, Nov. 19, 1975, abandoned. This application Jun. 3, 1977, Ser. No. 803,266

Int. Cl.[2] C10G *1/02*

U.S. Cl. 208—11 R **9 Claims**

1. A batch method of processing oil shale or other similar solid material containing recoverable hydrocarbons, comprising the steps of:

placing a batch of said oil shale within a heating system which is closed to the entrance of atmospheric air, said system including a furnace for indirect heating of gases;

holding said batch of oil shale stationary within said system;

initially heating said stationary batch of oil shale until a substantial quantity of hydrocarbons begin to vaporize therefrom while maintaining said system in said closed condition such that the pressure within said system increases during said initial heating, said initial heating including the steps of, cyclically,

(1) heating a substantially oxygen-free gas in said furnace;

(2) passing the heated gas through said oil shale for heating thereof; and

(3) passing said gas directly back to said furnace from said shale batch, said direct passage occurring in a manner to preclude substantial cooling of said gas and separation of materials therefrom;

further heating the stationary batch of oil shale after said substantial quantity of hydrocarbons has begun to vaporize therefrom and admix with said gas, and recovering said vaporized hydrocarbons,

said further heating and hydrocarbon recovery step including the steps of maintaining said system closed to the entrance of atmospheric air, and—

(1) continuing the heating of said oil shale batch by, cyclically,—

(a) heating said substantially oxygen-free gas and at least a portion of the vaporized hydrocarbons admixed therewith in said furnace;

(b) passing the heated gas and vaporized hydrocarbons through said oil shale for heating of the latter; and

(c) passing said gas vaporized hydrocarbons directly back to said furnace for additional heating thereof, said direct passage occurring in a manner to preclude separation of hydrocarbons from said gas in said heating system, by cooling of the gas and vaporized hydrocarbons sufficient to cause condensation of the vaporized hydrocarbons within the heating system; and

(2) during said continued heating of the oil shale, opening said system and passing a portion of said gas and volatilized hydrocarbons out of said heating system and into a recovery stage which is separate from said heating system in order to allow recovery of said vaporized hydrocarbons and to lessen the extent of any pressure increase within said system, and recovering said vaporized hydrocarbons therein.

4,088,563

PROCESS FOR THE TREATMENT OF WATER SOLUTION BY ION EXCHANGE

Kurt Marquardt, Holzgerlingen, Germany, assignor to Hager & Elsaesser, Vaihingen, Germany

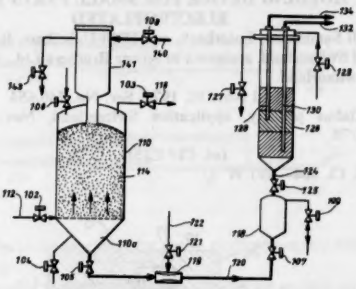
Continuation-in-part of Ser. No. 395,854, Sep. 10, 1973, Pat. No. 3,915,861, which is a continuation of Ser. No. 135,146, Apr. 19, 1971, abandoned. This application Dec. 4, 1974, Ser. No. 529,549

Claims priority, application Germany, Jan. 24, 1974, 2403274

The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.[2] B01D *15/02, 15/06*

U.S. Cl. 210—33 **1 Claim**



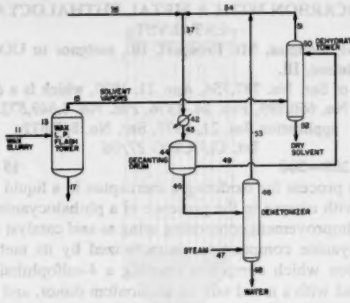
1. In a process for the treatment of water including cyclic operation of an ion exchange mixed bed system wherein a mixture of anion and cation exchange material through which untreated water is arranged to flow in a treatment container is cyclically fed in charges from the bottom of the treatment container to a back-rinsing and separation column, the volume of the said charges is set in a measuring column connected to the output of the treatment container and the input of the back-rinsing and separation column, the mixed anion and cation exchange material is separated in the said back-rinsing and separation column such that an anion exchange mass is disposed in a region above a region containing a cation exchange mass with a further intermediate region containing a mixture of anion and cation exchange material between the upper and lower region, anion and cation exchange charges are separately drawn off from the upper and lower regions in the back rinsing and separation column, the charges being fed into separate regeneration and wash columns and thence returned into the treatment container the improvement which consists in that chemicals capable of assisting in the separation of cation and anion exchange masses are admixed and introduced into the system ejector by means of an disposed between the treatment container and the measuring column.

4,088,564

DEHYDRATING PROCESS FOR KETONE DEWAXING SOLVENTS

Stephen F. Perry, Westfield, and Ralph R. Hall, Morristown, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 20, 1976, Ser. No. 752,134
Int. Cl.² C10G 43/14
U.S. Cl. 208—33 16 Claims



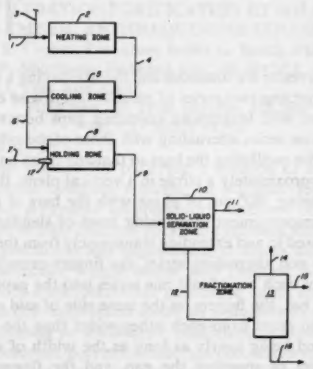
1. An improved process for dehydrating ketone dewaxing solvent recovered by evaporation and steam stripping comprising recovering a portion of ketone dewaxing solvent from a wax slurry as vapor from a wax slurry evaporation zone, condensing wet solvent recovered from said steam stripping and forming two immiscible liquid layers therefrom, a water-rich liquid layer and a solvent-rich liquid layer, passing said solvent-rich liquid to a dehydrating zone wherein said solvent in said solvent-rich liquid is dehydrated and passing said water-rich liquid layer to a deketonizing zone to remove solvent from the water, wherein the improvement comprises passing said ketone dewaxing solvent vapor from said wax slurry evaporation zone directly to said dehydrating zone thereby operating said dehydrating zone without reboiling means.

4,088,565

SOLVENT DEWAXING PROCESS

Leonard R. Watts, Nederland, Tex., and Norman L. Brewer, Rockaway Township, Morris County, N.J., assignors to Texaco Inc., New York, N.Y.

Filed Jul. 5, 1977, Ser. No. 812,958
Int. Cl.² C10G 43/08
U.S. Cl. 208—33 5 Claims



1. In a continuous solvent dewaxing process for separating solid wax from waxy petroleum distillate oil stock, wherein said waxy oil stock, heated for dissolving all wax therein, is treated with dewaxing solvent in a volume ratio of solvent to oil of about 1:1 to 5:1, wherein the oil/solvent mixture is cooled at a rate of about 1°–8° F/min. to a selected separation temperature in the range of about +25° to −40° F for forming a mixture of wax crystals in oil-solvent solution, wherein said wax/oil/solvent mixture is separated, in a solid-liquid separation zone, into a dewaxed oil-solvent solution and slack wax, and wherein said dewaxed oil-solvent solution is fractionated, in a fractionation zone, to recover solvent and yield a dewaxed oil fraction; the improvement which comprises:

(a) heating, in a heating zone, a continuously flowing mixture of waxy oil stock and aromatic hydrocarbon dewaxing solvent, having a volume ratio of aromatic solvent to waxy oil of about 0.5/1 to 2/1, to a temperature above the melting point of solid wax for forming a waxy oil-/aromatic solvent solution;

(b) cooling, in a cooling zone, said heated waxy oil/aromatic solvent solution, at a rate of about 1°–8° F/min. to a selected separation temperature for crystallizing wax and forming a wax/oil/aromatic solvent mixture;

(c) mixing, in a mixing zone, said wax/oil/aromatic solvent mixture, at said separation temperature, with ketone dewaxing solvent, at about 0°–5° F below said separation temperature, in a volume ratio of ketone solvent to waxy oil charge in the range of 0.5/1 to 3/1, under conditions of plug flow radial mixing for a residence time sufficient for equilibrating wax crystallization and forming a second wax/oil/solvent mixture; and

(d) flowing said second wax/oil/solvent mixture, at said separation temperature, to said solid-liquid separation.

4,088,566

TRANSFORMER OIL PROCESSING

Theodore C. Mead, Port Neches, and Norman R. Odell, Nederland, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Jun. 29, 1977, Ser. No. 811,336
Int. Cl.² C10G 27/04, 23/00
U.S. Cl. 208—90 9 Claims

1. A method of making transformer oils comprising

(a) contacting a naphthene oil with an oxygen-containing gas selected from the group consisting of air, oxygen, ozone, oxides of nitrogen, and mixtures thereof, and with a catalytic amount of sulfuric acid at a temperature from about 150° to 200° F and a pressure ranging up to about 300 psi,

(b) contacting the oil from (a) with an aqueous solution of a base to wash out oxidates formed in step (a),

(c) contacting the oil from step (b) with hydrogen and with a hydrogenation catalyst at a temperature of from about 400° to 675° F at a pressure of from about 15 to 400 psi at a space velocity ranging from 0.1 to 10.0 vol/vol/hr with a hydrogen dosage from about 50 and 500 scfb, and

(d) separating a transformer oil product from step (c).

4,088,567

SOLIDS REMOVAL AND FLUID CATALYTIC CRACKING OF A SYNTHETIC HYDROCARBON STREAM DERIVED FROM HYDROCARBON-CONTAINING SOLIDS

Robert J. White, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 3, 1976, Ser. No. 747,269
Int. Cl.² C10G 11/00
U.S. Cl. 208—113 9 Claims

1. A process for upgrading a synthetic liquid hydrocarbon stream derived from hydrocarbon-containing solids having a 90% boiling point above 800° F and containing from 0.1 to 10 weight percent of finely divided solids which are insoluble in said hydrocarbon stream, which comprises:

(a) contacting said stream with a fluidized cracking catalyst in a catalytic cracking zone and catalytically cracking said stream under low-severity cracking conditions including a per-pass conversion of less than 25 weight percent said

stream to products boiling below 430° F, whereby carbon deposits on said catalyst, forming spent catalyst;

(b) removing from said cracking zone a first effluent comprising said spent catalyst and a first portion of said solids, said first portion of said solids comprising fines deposited with carbon on said spent catalyst or carbon-fines agglomerates, or a combination thereof;

(c) introducing said spent catalyst and said first portion of said solids into a catalyst regeneration zone and combusting at least a portion of said carbon thereby introduced, whereby a flue gas is produced, and removing at least a substantial portion of said first portion of said solids from said regeneration zone entrained in said flue gas;

(d) removing from said cracking zone a second effluent stream comprising catalytically cracked hydrocarbons and a second portion of said solids, and separating essentially all said second portion of said solids from at least a part of said catalytically cracked hydrocarbons.

4,088,568

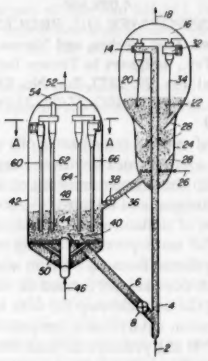
CATALYTIC CRACKING OF HYDROCARBONS

Albert B. Schwartz, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 649,261, Jan. 15, 1976, which is a continuation-in-part of Ser. No. 440,890, Feb. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 399,008, Sep. 20, 1973, abandoned, and a continuation-in-part of Ser. No. 599,920, Jul. 28, 1975. This application Feb. 19, 1976, Ser. No. 659,308

Int. Cl.² C106 *11/04;* B01J *8/24;* C01B *29/12*

U.S. Cl. 208—121 **12 Claims**



1. In a process for catalytic cracking of hydrocarbons in a cracking unit in the absence of added hydrogen, which comprises cofeeding active hot solid cracking catalyst and crackable hydrocarbon feed to a cracking zone; cracking said feed to lighter hydrocarbons while depositing coke on said catalyst and cooling said catalyst; disengaging said cooled, coked catalyst from said lighter hydrocarbon products; passing said coked catalyst to a regeneration zone; introducing an oxygen containing gas to said regeneration zone; intimately mixing said gas and said coked catalyst in said regeneration zone at a temperature and for a time sufficient to burn coke off said catalyst, heat and reactivate such, and produce a flue gas comprising carbon oxides; and returning said reactivated, heated catalyst to said cracking zone; the improvement, whereby increasing the ratio of carbon dioxide to carbon monoxide in said flue gas, which comprises, in combination:

providing sufficient oxygen to said regeneration zone to combust said coke to said increased ratio of carbon oxides;

introducing into said cracking unit a decomposable platinum group metal compound in quantity sufficient to deposit an amount not to exceed 100 parts per million of platinum group metal on said catalyst, said amount of metal being effective to produce said increased ratio of carbon oxides and insufficient to substantially increase the coke and light gas, including hydrogen, produced in said cracking zone; and maintaining the temperature in said regeneration zone high enough to produce said increased ratio of carbon oxides.

4,088,569

MERCAPTAN OXIDATION IN A LIQUID HYDROCARBON WITH A METAL PHTHALOCYANINE CATALYST

Walter M. Douglas, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 787,756, Apr. 21, 1977, which is a division of Ser. No. 660,899, Feb. 24, 1976, Pat. No. 4,049,572. This application Jul. 21, 1977, Ser. No. 817,872

Int. Cl.² C10G *27/06*

U.S. Cl. 208—206 **15 Claims**

1. In a process for oxidizing a mercaptan in a liquid hydrocarbon with oxygen in the presence of a phthalocyanine catalyst, the improvement comprising using as said catalyst a metal phthalocyanine composition characterized by its method of preparation which comprises reacting a 4-sulfophthalic acid compound with a metal salt, an ammonium donor, and a compound selected from the group of benzene-1,2-dicarboxylic acid and derivatives thereof, in aqueous solution by heating to 250° to 325° C for one-half to ten hours.

4,088,570

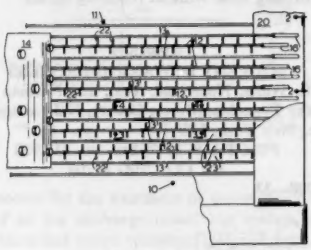
TOMATO HARVESTER SEPARATOR

Thomas S. Bettencourt, Isleton, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Feb. 16, 1977, Ser. No. 769,309

Int. Cl.² B07B *1/28*

U.S. Cl. 209—396 **2 Claims**



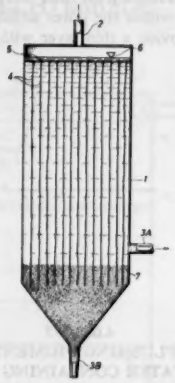
1. In a harvester for tomatoes and the like having a separator device comprising two series of parallel lengthwise extending walking bars with lengthwise extending gaps between them, the bars of one series alternating with those of the other series, and means for oscillating the bars so that any point on each bar moves in approximately a circle in a vertical plane, the bars of one series being 180° out of phase with the bars of the other series, the improvement comprising rows of slender resilient fingers secured to and extending transversely from the walking bars of one said alternating series, the fingers extending from both sides of each bar of said one series into the gaps on both sides of the bar, the fingers on the same side of said one series being spaced apart from each other wider than the width of each gap and being nearly as long as the width of a gap but slightly short of spanning the gap, and the fingers having sufficient resiliency so that when the fruit of the crop being harvested lands on a finger it gives and flexes and the fruit falls through and having sufficient rigidity to retain thereon stems, leaves and other lightweight vegetative matter.

4,088,571

METHOD AND APPARATUS FOR BIOLOGICAL PURIFICATION

Claes Ivar Helgesson, Akersberga, Sweden, assignor to Arbman Development AB, Stockholm, Sweden

Filed Feb. 9, 1976, Ser. No. 656,811
Claims priority, application Sweden, Feb. 28, 1975, 75023069
Int. Cl.² C02C 1/04
U.S. Cl. 210—17 24 Claims



1. In a method for biological purification of liquid wastes, e.g. waste waters, wherein the wastes are contacted with active micro-organisms on a carrier for the purpose of achieving degradation of organic contaminants, the improvement which comprises using a carrier of freely hanging, vertically disposed, substantially individualized fiber elements having at least a surface layer of an inert, silicious glass material the surface of which comprises a layer of colloidal silica.

9. In an apparatus for the biological purification of liquid wastes, such as waste waters, including a container having an inlet for liquid wastes, an outlet for purified wastes, a carrier for microorganisms, and means for fixing the carrier into the container, the improvement which comprises a carrier of vertically disposed, freely hanging, substantially individualized fiber elements having at least a surface layer of an inert, silicious glass material, the surface of said glass material comprising a layer of colloidal silica.

4,088,572

ULTRAFILTRATION PURIFICATION OF SOLUTION OF POLYMERIC ANTHRAQUINONE COLORANTS

Anthony R. Cooper, Los Altos; Robin G. Booth, Palo Alto, and David P. Matzinger, Redwood City, all of Calif., assignors to Dynapol, Palo Alto, Calif.

Filed Nov. 18, 1976, Ser. No. 743,206
Int. Cl.² B01D 13/00
U.S. Cl. 210—23 F 7 Claims

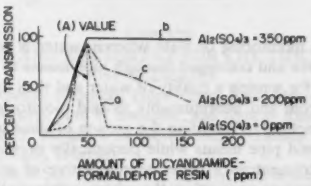
1. In the process for purifying a solution of a polymeric anthraquinone colorant wherein an aqueous feed solution comprising polymeric anthraquinone colorant of molecular weight above 1000 Daltons, polymeric colorant and polymeric colorant precursors and degradation products and inorganic salts of molecular weight below 1000 Daltons, is brought in contact with a semipermeable membrane under ultrafiltration conditions in a diafiltration mode for a plurality of diavolumes thereby forming an ultrafiltrate comprising polymeric anthraquinone colorant, polymeric colorant precursors and degradation products and inorganic salts of molecular weight below 1000 Daltons and a retentate comprising polymeric anthraquinone colorant of molecular weight above 1000 Daltons the improvement which comprises adding pyridine to said feed solution to a level of from 1 to 20% by volume and maintaining the pyridine content of the feed solution at this level for at least 1 diavolume by further addition of pyridine to the retentate.

4,088,573

METHOD FOR CLARIFYING AQUEOUS WASTE LIQUIDS CONTAINING ACID DYES

Mikio Nakajima, Fujisawa, and Kiyoaki Kuwabara, Yokohama, both of Japan, assignors to Nippon Carbide Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 565,462, Apr. 7, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 742,066
Claims priority, application Japan, Apr. 8, 1974, 49-38775
Int. Cl.² C02B 1/20
U.S. Cl. 210—53 3 Claims



1. A method for clarifying an aqueous waste liquid containing at least one acid dye dissolved therein, said method comprising sequentially bringing said waste liquid into contact with (a) a water-soluble dicyandiamide-formaldehyde resin and (b) at least 300 ppm of aluminum sulfate in the order of (a) followed by (b); the amount of said resin (a) being at least the optimum amount which is expressed by the formula

$$(A) \pm [(A) \times 0.1]$$

wherein (A) stands for an amount (ppm) of the dicyandiamide-formaldehyde resin measured by use of a jar tester which shows a maximum percent transmission measured by a light of a maximum absorption wavelength in the absorption curve of said acid dye;

wherein the amount of resin (a) and aluminum sulfate (b) are each based on 100 ppm of the acid dye dissolved in said aqueous waste liquid.

4,088,574

EMPLOYING METHYLENE PHOSPHONATES OF OXYALKYLATED POLYALKYLENE POLYAMINES IN CHELATION AND/OR SCALE INHIBITION

Patrick M. Quinlan, Webster Groves, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 455,344, Mar. 27, 1974, Pat. No. 4,012,440, which is a continuation of Ser. No. 90,837, Nov. 18, 1970, abandoned. This application Nov. 24, 1976, Ser. No. 744,821
Int. Cl.² C02B 5/06
U.S. Cl. 210—58 9 Claims

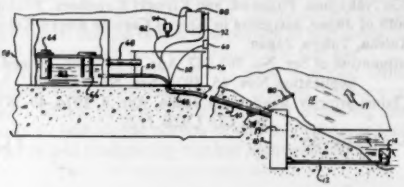
1. Process of chelating or inhibiting scale formation in aqueous systems containing metal salts which comprises adding to said aqueous system a small but effective amount of methylene phosphonates of oxyalkylated polyalkylene polyamines having at least 3 nitrogen atoms, said methylene phosphonates having nitrogen-bonded methylene phosphonate units of the formula $-CH_2PO(OM)_2$, M being alkali metal, alkaline earth metal, hydrogen, alkyl ammonium or ammonium, wherein as least 50% of the nitrogen-bonded hydrogens of the polyamine are replaced with the methylene phosphonate units and the remainder of the nitrogen-bonded hydrogens are oxyethylated.

4,088,575

AUTOMATIC SYSTEM CLEANER FOR REMOTE MONITOR

Jon D. Hilty, 125 Wolf Creek St., Brookville, Ohio 45309

Continuation of Ser. No. 580,623, May 27, 1975, abandoned.
This application Feb. 22, 1977, Ser. No. 770,710
Int. Cl.[2] C02B 3/06
U.S. Cl. 210—64 11 Claims



1. In the monitoring of wate wherein water is withdrawn from a source and conveyed through pipe means to a remote instrument for sensing a quality of water and then discharged remotely from and nonreturnably to said monitoring instrument, the method of retarding the growth of slime tending to adhere to said pipe means while periodically presenting said remote instrument with water representative of said source which comprises contacting the water substantially where withdrawn from said source with a biological poison at periods sufficiently spaced apart that water from said source which is substantially free of said poison will be presented to said sensing instrument between said spaced apart periods.

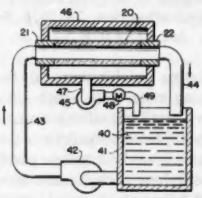
2. In a system for remotely monitoring a quality of water: means for withdrawing the water to be monitored from a source of said water, a sensing instrument, means for conveying the water withdrawn from said source to said instrument, and means for remotely discharging said water from said instrument so that said water does not return to said instrument, the improvement comprising a supply of biological poison, and means for retarding slime development by periodically introducing poison from said supply to the water to be monitored substantially where the water is withdrawn from said source and for allowing water which is substantially free of said biological poison to be conveyed periodically from said source to said instrument by withholding poison from said water for substantial time intervals between said periodic introductions of poison to the water to be monitored.

4,088,576

METHOD OF MANUFACTURE OF TUBULAR INERTIAL FILTER

Lambert H. Mott, c/o Mott Metallurgical Corporation, Farmington Industrial Park, Farmington, Conn. 06032

Filed Dec. 13, 1976, Ser. No. 749,874
Int. Cl.[2] B01D 35/18
U.S. Cl. 210—66 1 Claim



1. The method of manufacturing a tubular inertial filter comprising the steps of:

(a) providing a porous iso-permeable filter containing interconnecting pores, said filter being tubular and having an upstream inner surface;

(b) flowing a slurry containing at least some fine particles smaller than said pores through the tubular filter and withdrawing an effluent from a jacket disposed about said tubular filter filtering some of the slurry into the upstream surface of the filter until a layer of pores adjacent to the upstream surface is clogged by fine particles; and

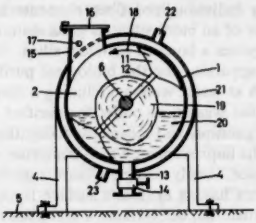
(c) removing and heating the filter thereby heat bonding the fine particles within the pores adjacent to the upstream surface to provide a thin layer with a higher degree of filtration.

4,088,577

METHOD FOR FLUSHING PIGMENTS IN THE FORM OF WATER CONTAINING CAKES

Helmut Müller, Mannheim, Germany, assignor to Firma Draiswerke GmbH, Mannheim-Waldorf, Germany

Filed Jul. 23, 1975, Ser. No. 598,232
Claims priority, application Germany, Aug. 3, 1974, 2437510
Int. Cl.[2] B01D 43/00
U.S. Cl. 210—67 9 Claims



1. A method for flushing pigments in the form of a water-containing pigment cake by replacing the water with a suitable organic vehicle, comprising the steps of:

feeding the pigment cake and the organic vehicle into a horizontally mounted mixing cylinder provided with an inlet opening and a lower closable outlet opening, said cylinder having a single coaxial mixing shaft therein, said shaft being provided with a plurality of projecting mixing tools, each of said mixing tools being connected to said shaft by means of a support rod which supports said mixing tool in the vicinity of the inside wall of said mixing cylinder;

driving said mixing shaft at a speed such that substantially all of a mass of viscous pigment-vehicle paste formed from said vehicle and the pigment of said cake, within said cylinder, forms on and is wound up on said mixing shaft, thereby causing said water to be separated from said mass, said speed being a subcritical speed, wherein critical speed is calculated in rpm as 42.3 divided by the square root of the diameter of the mixing cylinder in meters; and

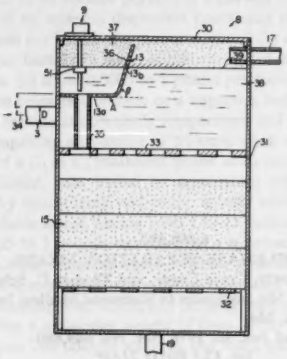
draining the separated water which collects in the space between the wound-up pigment-vehicle paste and the inside wall of said mixing cylinder through said lower outlet opening, during said driving step.

4,088,578

PROCESS AND APPARATUS FOR SEPARATING OIL FROM WATER CONTAMINATED WITH OIL

Teruo Yoshioka, Funabashi, and Shinichi Iwanami, Tokyo, both of Japan, assignors to Fujisash Industries, Ltd., Kawasaki, Japan

Filed Aug. 4, 1976, Ser. No. 663,803
Claims priority, application Japan, Mar. 7, 1975, 50-27070; Mar. 10, 1975, 50-27961; Apr. 3, 1975, 50-4417[U]
Int. Cl.² B01D *21/02*
U.S. Cl. 210—73 W 25 Claims



1. A process for separating oil from water contaminated with oil, comprising the steps of:

pumping the water contaminated with oil into a closed container, in which the oil floats as a separated oil layer and the water sinks as an underlying layer containing a purified water layer;

measuring the level of the interface between the oil layer and the underlying layer to thereby determine the relative amounts of the separated oil layer and the underlying layer;

depending upon the determined relative amounts, discharging either the separated oil or purified water from the container through a conduit for oil or a conduit for water, in such a manner that the separated oil is sucked through the conduit for oil so as to reduce the pressure of the liquid phases in said container and the purified water is forced to flow through the conduit for water by the pressure of said water contaiminated with oil being supplied into said container;

said discharging of either the separated oil or purified water being performed in an air-free condition in the container;

said pumping of the water contaminated with oil into said closed container being continued during said discharging of either the separated oil or purified water wherein the pressure of the liquid phases in said container is reduced to a value of from approximately 0.05 kg/cm² to approximately 0.5 kg/cm², while said separated oil is being sucked.

5. An apparatus for separating oil from water which is contaminated with the oil, comprising:

a closed air-free container for separating the oil from the water by allowing the oil to float up and the water to sink down so as to form a separated oil layer and an underlying layer which includes a purified water layer;

means for effecting the pressure of the liquid phases in said container to a value from approximately 0.05 kg/cm² to approximately 0.5 kg/cm² including,

a first continuously pump means for pumping said water contaminated with oil from a pool thereof to said container;

a control switch means for operating said first pump means in dependency on the level of the liquid in said pool;

a supply conduit entering said pool and connected to said container and said first pump means;

a water drain conduit connected to said container, communicating with the purified water and provided with a shut off means;

a second pump means for sucking said separated oil through an oil drain conduit defined below this pump means and reducing the pressure of the air-free liquid phases in said container;

an oil drain conduit connected to said container, communicating with the separated oil in said container and connected to said second pump means, and;

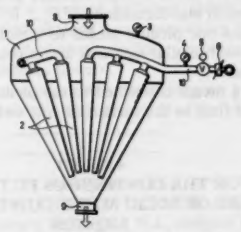
a float switch means in dependency on the level of the interface between the separated oil layer and the underlying layer and either operating said second pump means or opening said shut off means.

4,088,579

PROCESS AND EQUIPMENT FOR THE THICKENING OF SLURRIES

László Kocsányi, Budapest; Lajos Varga, Eger; Márton Kovács; Ferenc Takáts, both of Budapest, and György Kalo, Eger, all of Hungary, assignors to Heves Megyei Tanacsi Epitoipari Vallalat, Eger, Hungary

Continuation of Ser. No. 614,633, Sep. 18, 1975, abandoned. This application Mar. 18, 1977, Ser. No. 779,163
Claims priority, application Hungary, Sep. 20, 1974, KO 2679
Int. Cl.² B01D *23/24, 35/12*
U.S. Cl. 210—82 10 Claims



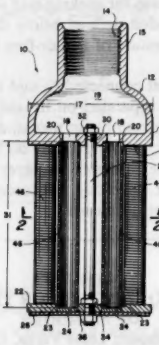
1. An apparatus for filtering slurry composed of a mixture of water and solid components, comprising a housing having an inlet, a first outlet spaced lengthwise of said housing from said inlet, a second outlet, and an inner circumferential wall extending in direction from said inlet to said first outlet; a plurality of hollow filter elements in said housing, each filter element extending in the direction from said inlet towards said first outlet, the exterior surfaces of the filter elements bounding together with said inner circumferential wall of said housing to form a flow passage the cross-sectional area of which decreases in the direction from said inlet towards said first outlet, the interior of each filter element communicating with said second outlet, said flow passage of decreasing cross-sectional area communicating with said first outlet so that the flow speed of said slurry along said filter direction towards said first outlet is at least substantially constant; and means for passing a slurry from said inlet through said flow passage to said first outlet of said housing in substantial parallelism with and in contact with the exterior surfaces of said filter elements, so that part of the liquid component of said slurry in said flow passage passes through the exterior surfaces of said filter elements into said filter elements for evacuation through said second outlet, whereas the remaining densified slurry passes substantially parallel to and in contact with the exterior surfaces of said filter elements to said first outlet and thereby continuously dislodges from the exterior surfaces of the filter elements the solid component which attempts to deposit thereon.

4,088,580

CLUSTER SCREEN FOR SAND CONTROL

James W. Spurlock, 7363 E. 58th Pl. S., Tulsa, Okla. 74145

Filed Dec. 1, 1976, Ser. No. 746,212
Int. Cl.[2] B01D *27/00, 33/00*
U.S. Cl. 210—323 T 16 Claims



1. A filter apparatus for separating particulate matter from fluid flowing from a formation within a well comprising:

(a) a plurality of small diameter, rigid tubular filter elements, the walls of said tubular elements having gauged openings for the flow of said fluid thereacross into the center of said elements;

(b) means to support said plurality of tubular elements, such that their axes are substantially parallel to the axis of said well and with their outer surfaces unencased and openly exposed to said formation;

(c) at least one plenum means to which said center space inside said tubular elements are in communication therewith; and

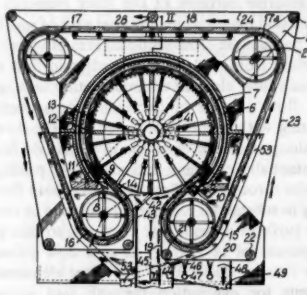
(d) tubing means connected to the plenum to conduct said filtered fluid to the surface of said well.

4,088,581

DEVICE FOR THE CONTINUOUS FILTRATION UNDER PRESSURE OF SOLID MATERIALS CONTAINED IN LIQUIDS

Jean-Claude Alfred Carle, Viry Noureuil, France, assignor to Societe anonyme des Fonderies et Ateliers L. Choquenet, Chauny, France

Filed Feb. 9, 1976, Ser. No. 656,537
Claims priority, application France, Feb. 12, 1975, 75 04343
Int. Cl.[2] B01D *33/14, 33/36*
U.S. Cl. 210—391 16 Claims



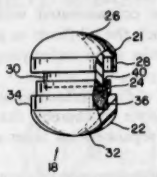
1. Continuous filtration apparatus for the separation of solids from a liquid mixture in which it is loaded comprising a rotary drum having a plurality of uniformly spaced orifices in its peripheral wall through which a loaded liquid under pressure is fed, an endless belt of filter material, an endless alveolar belt having a plurality of cells spaced apart corresponding to the distance between orifices in said drum, means for circulating said filter belt and said alveolar belt in a loop passing in part over a portion of said rotary drum, said filter belt being arranged to contact the surface of said drum and said alveolar belt arranged to contact the surface of said filter belt, and means for pressing said alveolar belt and filter belt against said rotary drum comprising a collar formed of a flexible and elastic band and a plurality of rollers mounted between said band and said belts, to exert a uniform centripetal compressive force to said belts.

4,088,582

BLOOD PHASE SEPARATION MEANS

Vabilisetti S. Murty, Creve Coeur, and Thomas C. Schuler, St. Louis, both of Mo., assignors to Sherwood Medical Industries Inc., St. Louis, Mo.

Filed Jan. 16, 1976, Ser. No. 649,880
Int. Cl.[2] B01D *21/26*
U.S. Cl. 210—516 6 Claims



1. A fluid collection device for receiving a liquid centrifugally separable into a lighter phase and a heavier phase during centrifugation of the device comprising a closed container, and phase partitioning means within said container including first and second axially spaced relatively movable members having a combined specific gravity intermediate that of the lighter phase and that of the heavy phase and with said first member having a specific gravity greater than that of said second member, one of said members including a cup-shaped portion having an inner bottom surface and inner side walls extending from said bottom surface to the open end of said cup-shaped portion, the other of said members having a piston portion with a surface normally in spaced facing relation with said bottom surface, and sealant material disposed in said cup-shaped portion between said bottom surface and said piston portion surface and in direct contact with both of said cup-shaped and piston portions, said sealant material having a specific gravity intermediate that of the lighter phase and that of the heavier phase, said piston portion being relatively movable in said cup-shaped portion toward said bottom surface to displace sealant material therefrom in response to the relative movement of said members toward each other due to centrifugal forces during centrifugation of the device, said cup-shaped and piston portions being sized and shaped such that sealant material flows axially within said cup-shaped portion in a direction toward the open end of said cup-shaped portion and radially outwardly into contact with the inner wall of said container to provide with said first and second members a partition sealing the heavier phase from the lighter phase.

4,088,583

COMPOSITION AND METHOD FOR DRILLING HIGH TEMPERATURE RESERVOIRS

Delbert E. Pyle, Northridge; David S. Pye, Brea, and Paul W. Fischer, Whittier, all of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Dec. 2, 1976, Ser. No. 746,937
Int. Cl.[2] C09K 7/02, 7/08
U.S. Cl. 252—8.5 A 19 Claims

1. An aqueous clay-free foam drilling fluid for drilling a well into strata containing a high temperature fluid comprising about 99.5 to 90 volume percent of a gas and 0.5 to 10 volume percent of an aqueous dispersion containing (a) about 327 to 347 pounds per barrel of aqueous medium, (b) about 0.25 to 10 pounds per barrel of a water-soluble or water-dispersible foaming agent, (c) about 0.0005 to 1 pound per barrel of an organic agent that releases ammonia or a vaporous amine and forms a resinous residue at downhole temperature and pressure conditions comprising a tri-amine or tri-ammonium salt of an acidic triester of a C_1 to C_4 trialkanol amine as an erosion and corrosion inhibitor, said amine or ammonium salt having been formed by neutralizing said acidic triester with ammonia or a water soluble amine having from 1 to 15 carbon atoms and (d) about 0.25 to 3 pounds per barrel of a water-soluble or water-dispersible polyalkylene oxide polymer wherein the polyalkylene oxide is selected from the group consisting of polyethylene oxide, polypropylene oxide, and polybutylene oxide, said polymer having a molecular weight of from 10^5 to 10^8, as a combination fluid loss control additive and foam stabilizer.

4,088,584

SECONDARY RECOVERY OF OIL AND POLYMERS USEFUL FOR THIS

Graham Smalley, Huddersfield; David A. Frost, and Eric Rothwell, both of Bradford, all of England, assignors to Allied Colloids Limited, Bradford, England

Filed Dec. 3, 1974, Ser. No. 529,176
Claims priority, application United Kingdom, Dec. 4, 1973, 561861/73
Int. Cl.[2] E21B 43/22; C08G 12/06
U.S. Cl. 252—8.55 D 12 Claims

1. A water flooding process for the secondary recovery of oil from a production well comprising injecting water under pressure to force oil to the production well, and in which the mobility of the water is reduced by including in the water a water soluble polymer, containg from 0 to 30 mole % methylol groups, made by reacting 0.1 to 2 moles formaldehyde with 1 mole polyacrylamide homopolymer or copolymer having a viscosity average molecular weight above 5×10^6 in an aqueous medium having a pH of above 11 but not more than 13 and that is substantially free of sulphite and that contains from 0.5 to 3% of the said homopolymer or copolymer and continuing with the reaction until crosslinks in the polyacrylamide are formed.

4,088,585

LUBRICANT CONTAINING MoS_2, LUBRICATING PROCESS, AND LUBRICATED WORKPIECE

William L. Karpen, Reading, Pa., assignor to Carpenter Technology Corporation, Reading, Pa.

Filed Nov. 13, 1975, Ser. No. 631,732
Int. Cl.[2] C10M 1/10, 3/02, 5/02, 7/04
U.S. Cl. 252—28 34 Claims

1. A composition for forming a dry lubricating film on metallic workpieces, comprising powdered MoS_2, soluble silicate wherein the silicate comprises silicon dioxide and an oxide selected from the group consisting of sodium oxide and potassium oxide, hydroxyethyl cellulose, and the balance water.

4,088,586

MANNICH BASE COMPOSITION

Donovan R. Wilgus, Richmond, and John M. King, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jun. 7, 1976, Ser. No. 693,807
Int. Cl.[2] C10M 1/34
U.S. Cl. 252—51.5 R 11 Claims

1. The condensation product of tetrapropenylphenol, formaldehyde and diethylenetriamine wherein the molar ratio of reactants is 1 mol tetrapropenylphenol to 0.5 to 0.85 mol formaldehyde to at least 0.3 mol diethylenetriamine.

4,088,587

LUBRICATING OIL ADDITIVE COMPOSITIONS

Warren Lowe, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 20, 1975, Ser. No. 624,204
Int. Cl.[2] C10M 1/48, 3/42, 5/24, 7/46
U.S. Cl. 252—32.7 E 15 Claims

1. A composition comprising: (1) an antioxidant selected from oil-soluble, sterically hindered phenols or thiophenols, oil-soluble aromatic amines, and organic sulfur compounds containing from 3 to 40 weight percent sulfur, which is present within the compund as an organic sulfide or polysulfide or mixtures thereof; and (2) a phosphorus-containing composition prepared by reacting phosphorus oxychloride or phosphorus thiochloride with a 1,2-substituted imidazoline in which the 1-substituent is hydroxyalkyl of 1 to 10 carbon atoms and the 2-substitutent is an aliphatic hydrocarbon of 6 to 24 carbon atoms, or an oil-soluble N-aliphatic-substituted aminoalkyleneamide of a higher fatty acid containing 6 to 24 carbon atoms and containing a terminal hydroxyl group in the aliphatic substitutent, said alkylene group containing from 2 to 5 carbon atoms and said aliphatic radical containing 1 to 10 carbon atoms, or mixtures thereof.

4. A lubricating oil composition comprising an oil of lubricating viscosity and an antioxidant amount of the composition of claim 1.

4,088,588

POLYISOBUTYL CARBOXYLIC ACID AMIDES

Joseph Michael Pecoraro, Burlington, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

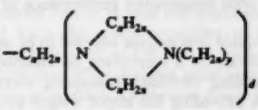
Filed Jun. 30, 1976, Ser. No. 701,749
Int. Cl.[2] C07C 103/34; C10M 1/36
U.S. Cl. 252—51.5 A 9 Claims

1. A carboxamide composition comprising N-substituted amides of polyisobutylcarboxylic acids, the polyisobutylcarboxylic acid component of the carboxamide consisting essentially of a mixture of

(i) at least about 80%, by weight, of a polyisobutylcarboxylic acid component characterized by substantially all carboxyl groups being attached to tertiary carbon atoms, and by less than about 20% of said acid component being extractable by successive treatments at 25° C with aqueous alkali and with water, and

(ii) up to about 20%, by weight, of a neutral polyisobutyl component, the polyisobutyl groups of components (i) and (ii) having an average molecular weight of about 750 to 3000;

the N-substituted component of the carboxamide having the formula, —N(R)Z, where R is hydrogen or lower alkyl, and Z is



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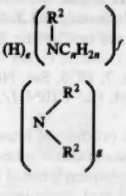


where n is 2 or 3, R^2 is independently hydrogen or lower alkyl, d, e, g, and y are 0 or 1, and f is 0 to 5, with the provisos that:

a. when $d = 0$, then $e = 0$, $f = 1$ to 5 and $g = 1$,

b. when $d = 1$ and $y = 0$, then $e = 1$ and f and g are 0, and

c. when $d = 1$ and $y = 1$, then $e = 0$, $f = 1$ to 5 and $g = 1$.

4,088,589

DUAL POUR DEPRESSANT COMBINATION FOR VISCOSITY INDEX IMPROVED WAXY MULTIGRADE LUBRICANTS

Albert Rossi, Warren, and William J. Fernandez, Kearny, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed May 20, 1976, Ser. No. 688,186
Int. Cl.² C10M 1/24
U.S. Cl. 252—56 R **10 Claims**

1. A lubricating oil composition comprising a lubricating oil and a viscosity index improving amount of an oil-soluble polymer composition consisting essentially of a copolymer of ethylene and a C_3 to C_{18} higher alpha-olefin and having an ethylene content of 40–50 wt. %, said lubricating oil blended from a major proportion of at least one light blending distillate having a viscosity of from about 63 to 77 SUS at 37.8° C., and a second light blending distillate having a viscosity of from about 138 to 152 SUS at 37.8° C., and formulated with a mixture of pour depressants comprising:

(a) from about 0.05 to about 0.75 wt. % of an oil-soluble condensation product of a chlorinated long-chain alkyl hydrocarbon having from about 10 to about 50 carbon atoms and a mono- or dinuclear aromatic hydrocarbon and,

(b) from about 0.05 to about 0.75 wt. % of an oil-soluble polyester pour depressant of the class consisting of a polymeric ester of acrylic acid or methacrylic acid and a monohydric alcohol containing from 10 to 18 carbon atoms, an interpolymer of a vinyl alcohol ester of a C_2 to C_{18} alkanoic acid and a di(C_6–C_{18} alkyl) fumarate and mixtures thereof, the weight ratio of (a) to (b) ranging from about 3:1 to 1:3.

7. The method of treating a lubricating oil, having a characteristic viscosity index and pour point, to improve the viscosity index without adversely affecting the pour point which comprises: (1) adding to said lubricating oil a viscosity index improving amount of an oil-soluble copolymer which consists essentially of ethylene and a C_3 to C_{18} higher alpha-olefin having an ethylene content of from 40 to 50 wt. %, said lubricating oil comprising a major weight proportion of at least two blends of petroleum distillates containing waxy components; and (2) thereafter formulating said lubricating oil with from about 0.15 to about 1 wt. % of a combination of pour point depressants comprising (a) from about 0.05 to about 0.75 wt. % of an oil-soluble condensation product of a chlorinated wax of from about 10 to about 50 carbons and a mono- or di-nuclear aromatic hydrocarbon; and, (b) from about 0.05 to about 0.75 wt. % of an oil-soluble polymer of a C_{10-18} alkyl acrylate or methacrylate and/or an interpolymer of a vinyl alcohol ester of a C_2 to C_{18} alkanoic acid and a di(C_6–C_{18} alkyl) fumarate whereby the cold temperature performance of said oil is improved.

8. An oil-soluble concentrate adapted to be used as a viscosity index modifier for a lubricating oil blended from at least two light blending distillates containing waxy components, said distillates providing the major weight proportion of the formulated lubricating oil composition which comprises from about 4 to 14 wt. % of an ethylene-propylene copolymer which has an ethylene content of from 40 to 50 wt %. and has a (M_n) of from about 40,000 to 200,000, from about 0.5 to about 2.5 wt. % of an oil-soluble condensation product of a chlorinated wax of from about 10 to about 50 carbons and a mono- or dinuclear aromatic hydrocarbon and from about 0.5 to about 2.5 wt. % of an oil-soluble polyester pour point depressant of the class consisting of a polymeric ester of acrylic acid or methacrylic acid and a monohydric alcohol containing from 10 to 18 carbon atoms, an interpolymer of a vinyl alcohol ester of a C_2 to C_{18} alkanoic acid and a di(C_6–C_{18} alkyl) fumarate and mixtures thereof in a major weight proportion of mineral oil.

4,088,590

HYDRAULIC FLUID CONTAINING TERTIARY BUTYL ETHERS

Wolfgang Knoblauch, Burghausen, Salzach; Rainer Mücke, Burgkirchen, Alz, and René Salvador, Altotting, all of Germany, assignors to Hoechst Aktiengesellschaft and Alfred Teves GmbH, both of Frankfurt am Main, Germany

Continuation of Ser. No. 512,166, Oct. 4, 1974, abandoned. This application Sep. 28, 1976, Ser. No. 727,460
Claims priority, application Germany, Oct. 9, 1973, 2350569
Int. Cl.² C10M 3/22, 3/14
U.S. Cl. 252—73 **3 Claims**

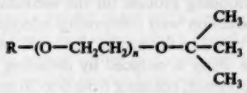
1. An improved hydraulic fluid composition consisting essentially of

(a) an effective amount for lubrication of polyalkylene glycols,

(b) an effective amount for viscosity control of alkyl polyalkylene glycols,

(c) an effective amount for corrosion inhibition and antioxidation of inhibitors, and

(d) a regulating agent for the viscosity and lubricating properties, wherein the improvement resides in employing as regulating agent 5–30% by weight of the total hydraulic fluid composition of an alkyl polyethylene glycol tert.-butyl ether or a mixture thereof of the formula



wherein R is a linear or branched alkyl of 1–4 carbons and n is a whole number of 2–10.

4,088,591

SILICONE FLUID USEFUL AS A BRAKE FLUID

Edgar D. Brown, Jr., Schenectady, and Frank J. Traver, Troy, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Division of Ser. No. 290,075, Sep. 18, 1972, abandoned. This application Feb. 4, 1974, Ser. No. 439,316
Int. Cl.² C10M 3/44
U.S. Cl. 252—75 **8 Claims**

1. A process for transmitting force through a hydraulic system having hydraulic activating means, hydraulic activated means and hydraulic line means connecting said hydraulic activating means with said hydraulic activated means comprising applying force to said activating means wherein said hydraulic activating means, said hydraulic activated means and said hydraulic lines are substantially filled with a linear polymer silicone hydraulic fluid of the formula,

where n varies from 1 to 2000, R is selected from the class consisting of monovalent hydrocarbon radicals, halogenated monovalent hydrocarbon radicals and cyanoalkyl radicals and the viscosity of said fluid varies from 20 to 500 centistokes at 25° C and 1 to 60% by weight of the total fluid of a water tolerance additive of the formula,

$$R^{13}(O—C_vH_{2v})_w—O—R^1—M$$

where R^{13} is selected from lower alkyl radicals of 1 to 8 carbon atoms, R^1 is selected from the class consisting of alkylene and arylene radicals of 2 to 12 carbon atoms, M is selected from the class consisting of —OH, and $R^{13}(O—C_vH_{2v})_w—O—$, where v is a whole number that varies from 2 to 4 and w is a whole number that varies from 2 to 10.

4,088,592

DURABLE FLAME RETARDANT FINISHES FOR TEXTILE MATERIALS

Ray E. Smith, Ann Arbor, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Feb. 23, 1976, Ser. No. 660,503

Int. Cl.² C09K *3/28*

U.S. Cl. 252—8.1 **48 Claims**

1. A flame retardant textile finish, said textile being cotton or a blend of cotton and polyester fibers, consisting essentially of:

(a) from about 15 percent to about 35 percent of a flame retardant compound of the formula $(RO)_3—P=O$ wherein each R is independently selected from halogenated aliphatic groups containing from 2 to about 6 carbon atoms and from 1 to about 3 halogen substituents per group and mixtures thereof;

(b) from about 0.5 percent to about 10 percent of an emulsifying agent which is capable of passing the following three tests: (1) Solubility (Compatability) Test; said emulsifying agent (20 parts by weight) must be soluble in 80 parts by weight of said flame retardant compound at no more than 80° C.; (2) Shelf Life Test: a blend of said emulsifying agent and said flame retardant compound prepared as in the Solubility Test must remain in one clear homogeneous phase at 22° C. for at least one hour; (3) Finish Formulation Test: a flame retardant finish within the scope of this invention is prepared and must remain in one homogeneous phase for a minimum of 1 hour at 20° C.;

(c) from about 25 percent to about 45 percent of a water soluble quaternary phosphonium salt selected from the group consisting of a tetrakis(hydroxymethyl) phosphonium and tetrakis(methylhydroxymethyl) phosphonium salts;

(d) from about 9 percent to about 16 percent of a water soluble organic nitrogen containing compound selected from the group consisting of urea, thiourea, guanidine and dicyandiamide; and

(e) from about 20 percent to about 32 percent of water.

4,088,593

ION-EXCHANGING ALUMINUM SILICATE WITH HYDROPHILIC SURFACES

Wolfgang Roebke, Altenstadt; Dieter Kneitel, and Erfried Parr, both of Rodenbach, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA) and Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, both of, Germany

Division of Ser. No. 664,174, Mar. 5, 1976, Pat. No. 4,040,972. This application Mar. 30, 1977, Ser. No. 782,749

Claims priority, application Germany, Mar. 12, 1975, 2510675; Mar. 12, 1975, 2510741; Ma.. 12, 1975, 2510742; Mar. 12, 1975, 2510676

Int. Cl.² C01B *33/28;* C02B *1/16, 1/44;* C11D *7/29*

U.S. Cl. 252—89 R **10 Claims**

1. In a washing, rinsing or cleansing agent containing an alkali aluminum silicate and a detergent, the improvement comprising employing as said silicate the hydrophilic alkali aluminum silicate prepared by the process comprising mixing a crystalline ion exchanging alkali metal aluminum silicate with a hydrophilic material which is ortho phosphoric acid, an alkali metal ortho phosphate, pentasodium tripolyphosphate, tartaric acid, an alkali metal tartrate or pentaerythritol in the presence of water, said hydrophilic material being employed in an amount sufficient to impart hydrophilicity to the alkali metal aluminum silicate but not over 30% of the weight of the silicate, drying and subsequently grinding the treated silicate to a particle size of not over 100 microns.

4,088,594

STABILIZED DETERGENT COMPOSITIONS

George W. Fernley, and Gerdina J. R. Daane nee Pluim, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 10, 1976, Ser. No. 749,493

Claims priority, application United Kingdom, Dec. 19, 1975, 52101/75

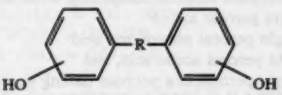
Int. Cl.² C11D *1/68, 3/20, 17/08;* C09K *15/08*

U.S. Cl. 252—89 R **4 Claims**

1. A detergent concentrate comprising:

(a) an alkyl polyoxyalkylene ether non-ionic surfactant, and

(b) from about 10 to about 100 percent by weight based on (a) of an additive of the general formula:



wherein R is a C_1 to C_6 alkylidene group

4,088,595

DETERGENT COMPOSITION COMPRISING A SYSTEM PRODUCING SUPEROXIDE IONS

Adolf Michael Michelson, Chatenay-Malabry, and Philippe Rotter, Noisy-le-Roi, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Continuation of Ser. No. 533,640, Dec. 17, 1974, abandoned. This application Aug. 6, 1976, Ser. No. 712,329

Claims priority, application France, Dec. 21, 1973, 73 45987

Int. Cl.² C11D *3/395, 7/54*

U.S. Cl. 252—95 **9 Claims**

1. A detergent composition consisting essentially of soap or granular synthetic detergents, and an amount sufficient to produce superoxide ions of at least one water soluble salt of a metal selected from the group consisting of divalent iron, divalent cobalt and divalent nickel, and an amount in moles of from 1 to 10 times that of the divalent metal ions of at least one water soluble ligand which is a hydrogen donor and has at least

two sites available for fixing to the said metal selected from the group consisting of $-NH_2$ and $-COOH$ and mixtures thereof.

4,088,596

METHOD OF TREATING DRAINS

Haruhiko Arai, Narashino, and Yumio Nakasone, Sakura, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jan. 13, 1977, Ser. No. 758,958
Claims priority, application Japan, Feb. 27, 1976, 51-21388; Jun. 15, 1976, 51-70499
Int. Cl.[2] C11D *7/56, 7/18*
U.S. Cl. 252—99 33 Claims

1. A method of treating clogged, slow running or bad-smelling drains, which comprises the steps of: depositing in said drain an effective amount of a drain cleaner composition consisting essentially of an inorganic peroxide selected from the group consisting of sodium perborate, sodium percarbonate, $4Na_2SO_4.NaCl.2H_2O_2$, $Na_2SiO_3.3H_2O_2$, $Na_4P_2O_7.nH_2O_2$ wherein n is 1, 2 or 3, $Na_3PO_4.4H_2O_2.2H_2O$ and $Na_3PO_4.9/2H_2O_2$.

24. A method of treating clogged, slow running or bad-smelling drains, which comprises the step of: depositing in said drain an effective amount of a drain cleaner composition consisting essentially of from 25 to 80% by weight of an inorganic peroxide selected from the group consisting of sodium perborate, sodium percarbonate, $4Na_2SO_4.NaCl.2H_2O_2$, $Na_2SiO_3.3H_2O_2$, $Na_4P_2O_7.nH_2O_2$ wherein n is 1, 2 or 3, $Na_3PO_4.4H_2O_2.2H_2O$ and $Na_3PO_4.9/2H_2O_2$, from 2 to 55% by weight of water-soluble organic surface active agent and the balance is essentially silica, alkali metal sulfates, alkali metal carbonates, alkali metal silicates, alkali metal borates, alkali metal halides, alkali metal phosphates or mixtures thereof.

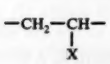
4,088,597

IODOPHOR SOLUTION

Gerhard Morlock, and Gerhard Stehlik, both of Hanau, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Jun. 13, 1977, Ser. No. 805,872
Int. Cl.[2] A61K *33/18;* A61L *13/00;* C11D *3/48*
U.S. Cl. 252—106 19 Claims

1. An aqueous iodophor solution comprising water and
(a) 0.5 to 3 weight percent iodine
(b) 10 to 30 weight percent phosphoric acid
(c) 5 to 30 weight percent acetic acid, and
(d) 0.5 to 20 weight percent of a polymer having an average molecular weight between 500 and 10,000 and consisting essentially of repeating units of the general formula



where X in 90 to 65% of the cases in COOH, in 10 to 35% of the cases in

and in 0 to 10% of the cases is selected from the group consisting of (1) CH_2OH, (2) CN, (3)

and (4) mixtures of at least two of (1), (2) and (3), the X side chain groups being distributed statistically at random.

4,088,598

LOW SUDSING DETERGENT COMPOSITIONS

Michael Kevin Williams, Seaton Delaval, England, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 10, 1975, Ser. No. 621,456
Claims priority, application United Kingdom, Oct. 14, 1974, 44385/74
Int. Cl.[2] C11D *1/825, 3/075*
U.S. Cl. 252—135 8 Claims

1. A detergent composition consisting essentially of
(a) from 0.5% to 95% by weight of a nonionic detergent and
(b) suds-depressing surface-active agent having the general formula $RO(C_nH_{2n}O)_x—COR^3$, in which R is an alkyl group comprising 8 to 20 carbon atoms, n is 2, 3 or 4, x represents the average degree of alkoxylation and is from 0.5 to 7 and R^3 represents an alkyl or alkenyl group having one to nine carbon atoms, the weight ratio of (b) to (a) being at least 1 to 12.

4,088,599

TERBIUM-ACTIVATED ALKALINE-EARTH METAL SILICATE PHOSPHORS

Teruki Suzuki, Funabashi; Shinkichi Tanimizu, Kokubunji, and Yukio Ohno, Ome, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jul. 9, 1976, Ser. No. 704,084
Claims priority, application Japan, Jul. 11, 1975, 50-84474
Int. Cl.[2] C09K *11/46*
U.S. Cl. 252—301.4 F 11 Claims

1. A phosphor composition which comprises an alkaline-earth metal silicate host lattice activated by trivalent terbium together with monovalent alkaline metal as a charge compensator, said phosphor composition corresponding to the formula, $X_{3-x}Y_{1-x}Si_2O_8$: Tb_x, Z_x wherein X is at least one of Ba, Sr, and Ca; Y is at least one of Mg and Zn; and Z acting as a charge compensator is at least one of Li, K, and Na, and x is from 0.001 to 0.95, calcium of the elements represented by X being in an amount of not more than 10% by mole.

4,088,600

DEMULSIFICATION USING CATIONIC STARCHES OF THE QUATERNARY AMMONIUM TYPE

Thomas R. Tutein, Cary; Anne E. Harrington, Chicago, and Jose T. Jacob, Lake Zurich, all of Ill., assignors to Chemed Corporation, Cincinnati, Ohio

Filed Nov. 30, 1976, Ser. No. 746,160
Int. Cl.[2] B01D *17/04*
U.S. Cl. 252—344 8 Claims

1. The process of demulsifying an emulsion consisting essentially of oil and water comprising treating same with a quaternary ammonium cationic starch.

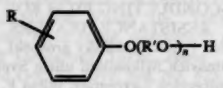
4,088,601

WATER-EMULSIFIABLE DEFOAMER COMPOSITION

Hugh J. S. Shane, Guelph, and Frederick S. Schell, Kitchener, both of Canada, assignors to Hart Chemical Limited, Guelph, Canada

Filed Nov. 11, 1974, Ser. No. 522,489
Int. Cl.[2] B01D *17/00*
U.S. Cl. 252—358 57 Claims

1. A substantially inorganic-particulate-free defoamer composition inherently capable of forming a stable oil-in-water emulsion and consisting essentially of from about 1.5 to about 12% by weight of an aliphatic diamide, said diamide being formed from a polymethylene diamine containing from 2 to 6 carbon atoms and at least one long chain aliphatic carboxylic acid containing from 12 to 22 carbon atoms, a small quantity of a silicone oil, from about 1 to about 8% by weight of an alkoxylated alkyl substituted phenol having the formula:



wherein R is an alkyl group containing from 8 to 10 carbon atoms, R' is an alkyl group containing two or three carbon atoms, and n is a value from greater than 4 to less than about 8, and the balance of a low viscosity mineral oil, said diamide having an average particle size from 4 to 7 on the Hegman scale and being dispersed substantially uniformly throughout said oil.

4,088,602

DEHYDROGENATION CATALYST

Windell C. Watkins, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 583,936, Jun. 5, 1975, Pat. No. 4,029,695, which is a continuation-in-part of Ser. No. 498,885, Aug. 20, 1974, Pat. No. 3,975,301, which is a division of Ser. No. 409,823, Oct. 26, 1973, Pat. No. 3,855,279. This application Mar. 9, 1977, Ser. No. 776,016

Int. Cl.[2] B01J *27/14*

U.S. Cl. 252—437 5 Claims

1. A catalyst consisting of the calcined residue of a mixture of (a) a base component consisting essentially of the phosphates of iron and lead wherein the atomic ratio of the metals is defined by 1 Fe/x Pb where x is from about 0.1 to about 10, and (b) a modifier component selected from the group consisting of manganese, uranium, praseodymium, calcium, strontium and chromium wherein said modifier component is present in amounts of from about 0.1% to about 10% based on the weight of the base component.

4,088,603

CATALYST ACTIVATION PROCESS

James L. Carter, Westfield, and John H. Sinfelt, Berkeley Heights, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 654,693, Feb. 2, 1976, abandoned. This application Jun. 7, 1977, Ser. No. 804,438

Int. Cl.[2] B01J *29/00, 29/10, 29/20*

U.S. Cl. 252—454 24 Claims

10. A process for activating a reducing catalyst comprised of nickel and silica and capable of having a reduced nickel surface area ranging from about 55 to about 100 m^2/g and a total surface area ranging from about 150 to about 300 m^2/g, comprising the steps:

(a) reducing the catalyst by heating the catalyst in increments in the presence of hydrogen at a temperature sufficient to partially activate the catalyst;

(b) contacting said partially active catalyst in the presence of hydrogen with a reactant feed which undergoes an exothermic reaction in the presence of said partially activated catalyst at conditions whereby said reaction occurs, said conditions including a temperature ranging from about 235° to about 275° C.; and

(c) continuing said contacting for a time sufficient to convert said partially activated catalyst to a high activity catalyst.

12. The process of claim 10 wherein said catalyst additionally includes copper.

4,088,604

CATALYST FOR THE DECOMPOSITION OF NITROGEN OXIDES

Paul Anthony Sermon, Cowley, England, assignor to Johnson, Matthey & co., Limited, London, England

Continuation of Ser. No. 553,308, Feb. 26, 1975, abandoned. This application Nov. 9, 1976, Ser. No. 740,172

Claims priority, application United Kingdom, Mar. 6, 1974, 10063/74

Int. Cl.[2] B01J *21/04, 21/12, 23/74*

U.S. Cl. 252—455 R 4 Claims

1. A catalyst material for the decomposition of one or more oxides of nitrogen comprising a ceramic or metal catalyst substrate having deposited thereon a first layer comprising an adherent oxide coating and having on said first layer a layer of a catalyst consisting essentially of a mixed oxide selected from the group of mixed oxides consisting of

$Co^{II}Fe^{II}Fe_2^{III}O_4$;

$Co^{II}Fe_2^{III}O_4$;

$Co^{II}Co^{III}Fe^{III}O_4$;

and

$Co^{II}Co_2^{III}O_4$.

4,088,605

ZSM-5 CONTAINING ALUMINUM-FREE SHELLS ON ITS SURFACE

Louis D. Rollmann, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 24, 1976, Ser. No. 726,353

Int. Cl.[2] B01J *29/06;* C01B *33/28*

U.S. Cl. 252—455 Z 20 Claims

1. A composition comprising a crystalline aluminosilicate zeolite having an aluminum-free outer shell of SiO_2, said zeolite being made by a two stage method comprising:

(1) initiating crystallization in a crystallization medium to produce the zeolite and

(2) altering the crystallization medium to substantially eliminate the aluminum therein

said outer shell of SiO_2 having the same crystal structure as said zeolite.

6. The composition of claim 1 wherein the reaction mixture, to produce the SiO_2 outer shell, exclusive of added solid crystals, has the following composition, in terms of mole ratios of oxides:

$R/SiO_2 = 0.01 - 0.10$

$SiO_2/Al_2O_3 = 300 - 5000$

$H_2O/OH^- = 20 - 500$

$OH^-/SiO_2 = 0.05 - 1.0$

$M_2O/SiO_2 = 0.1 - 2$

wherein R is an organic ion and M is a mixture of alkali metal and organic cations.

4,088,606

COBALT BASE NOX REDUCING CATALYTIC STRUCTURE

Robert J. Fedor, Westlake, and Cameron S. Ogden, Hudson, both of Ohio, assignors to Gould Inc., Rolling Meadows, Ill.

Continuation of Ser. No. 467,106, May 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 207,525, Dec. 13, 1971, abandoned, which is a continuation-in-part of Ser. No. 149,331, Jun. 2, 1971, abandoned. This application Sep. 27, 1976, Ser. No. 726,792

The portion of the term of this patent subsequent to Jul. 13, 1993, has been disclaimed.

Int. Cl.[2] B01J *21/04;* F01N *3/08*

U.S. Cl. 252—465 19 Claims

1. A catalytic structure capable of catalyzing the reduction of NO_x gases found in the exhaust stream of an internal combustion engine which is obtained by:

(a) forming an expanded metal foil substrate of constituents comprising:

(i) from about 50 to about 85 weight percent of a metal

selected from the group consisting of cobalt, a mixture of cobalt and iron, a mixture of cobalt and nickel, and a mixture of cobalt, nickel and iron, with cobalt always being present in an amount equal to a least about 17 weight percent of the substrate and the weight percent of iron and nickel individually never exceeding about 40 percent and always being less than the weight percent of cobalt; and

(ii) from about 15 to about 50 weight percent of a metal selected from the group consisting of chromium, aluminum and mixtures thereof with at least about 5 weight percent of chromium always present in the substrate and the amount of aluminum never exceeding about 10 weight percent; and

(b) metallurgically bonding an effective amount of a NO_x reducing catalyst to at least one surface of said substrate to form a catalytic layer thereon in such a manner that the chemical composition of the substrate is different than the chemical composition of the catalytic layer.

4,088,607

CATALYST AND METHOD OF PREPARING SAME

Guenther Weidenbach, Anderten; Karl Hermann Koepernik, Hanover, and Hans Brautigam, Grossburgwedel, all of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hanover, Germany

Division of Ser. No. 541,775, Jan. 17, 1975, Pat. No. 4,005,177.
This application Aug. 25, 1976, Ser. No. 717,741
Claims priority, application Germany, Jan. 19, 1974, 2402519
Int. Cl.[2] B01J *21/04, 23/60*
U.S. Cl. 252—466 PT 17 Claims

1. In a catalyst having a high thermal stability, including a solid catalytically active carrier material and a catalytically active metal component consisting essentially of at least one noble metal upon said carrier, the improvement which comprises said catalytically active carrier material consisting essentially of aluminum oxide and having admixed therewith between about 0.5 and 8% by weight of preformed zinc oxide.

4,088,608

CATALYSTS FOR REFORMING HYDROCARBON FUELS

Masao Tanaka, Aichi; Makoto Takemura, and Nobuei Ito, both of Okazaki, all of Japan, assignors to Nippon Soken, Inc., Japan

Filed Nov. 26, 1976, Ser. No. 745,047
Claims priority, application Japan, Dec. 17, 1975, 50-151099
Int. Cl.[2] B01J *21/04, 23/58*
U.S. Cl. 252—466 PT 5 Claims

1. A catalyst suitable for reforming hydrocarbon fuels by air partial oxidation or steam reforming into a hydrogen-rich reformed gas comprising an active carrier consisting of magnesium aluminate of spinel structure as represented by the formula

$$MgAl_2O_4$$

consisting of alumina and magnesium and the amount of magnesium is 2×10^{-3} to 1×10^{-2} mole/g based on the alumina and at least one catalyst metal selected from the group consisting of platinum, rhodium and a mixture thereof in an amount of 1×10^{-4} mole/g or less based on the alumina supported by said carrier.

4,088,609

CURRENT-CONDUCTING FILM FOR ELECTRIC RESISTANCE HEATERS

Gennady Petrovich Popov, Leninsky prospekt, 161, kv. 8; Alexandr Konstantinovich Mikhailidi, ulitsa Svobody, 55, kv. 96; Konstantin Andreevich Lavrentiev, ulitsa F. Engelsa, 42, kv. 43; Ivan Grigorievich Popov, Leninsky prospekt, 148, kv. 27, all of Voronezh; Viktor Vasilievich Zhukov, Proletarsky proezd, 12, kv. 25, and Nikolai Alexeevich Sorokin, ulitsa Gagarina, 47, kv. 21, both of Klin, Moskovskaya oblast, all of U.S.S.R.

Filed Sep. 13, 1976, Ser. No. 722,412
Claims priority, application U.S.S.R., Dec. 8, 1975, 2199248
Int. Cl.[2] H01B *1/02*
U.S. Cl. 252—512 1 Claim

1. A current conducting film for electric resistance heaters, consisting of tin dioxide, antimony and boron, the components being used in the following ratios, in percent by weight:
tin dioxide — 78.0–96.8
antimony — 3.0–20.2
boron — 0.2–2.0.

4,088,610

DETERGENT COMPOSITIONS

Geoffrey Bevan, and Peter Carter, both of Wirral, England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 375,269, Jun. 29, 1973, abandoned.
This application Dec. 10, 1975, Ser. No. 639,499
Claims priority, application United Kingdom, Jul. 12, 1972, 32651/72
Int. Cl.[2] C11D *3/26, 7/32*
U.S. Cl. 252—541 4 Claims

1. A detergent powder or liquid composition consisting essentially of from about

(A) 0.1% to about 5% by weight of a condensation product of

(a) a dicarboxylic acid of the formula $HO_2C_nCO_2H$ in which n represents zero or a positive integer from 1 to 10;

(b) a hydroxy-polyoxy-alkylene compound containing at least one polyalkylene chain consisting of a plurality of oxyalkylene radicals linked directly to one another whose alkylene groups contain from 2 to 4 carbon atoms; and

(c) a compound selected from the group consisting of:

(i) an amino acid or lactam compound of the formulae $NH_{2n}CO_2H$ and wherein n is a positive integer from 3 to 11,

(ii) an aliphatic diamine, or salt thereof, of the formula $NH_{2m}NH_2$ in which m is an integer of from 2 to 12, and

(iii) a mixture of said lactam compound with said diamine compound or salts thereof; in combination with:

(B) from about 0.5 to about 20% by weight of a detergent active compound selected from the group consisting of:

(a) an ethoxylated alkyl phenol wherein the total alkyl substituent contains from 6 to 12 carbon atoms, and wherein the molar ratio of the ethylene oxide moiety to the alkyl phenol moiety is from about 6:1 to about 25:1,

(b) a condensation product of ethylene oxide and

(i) a straight or branched chain, aliphatic, unsaturated C_{18} alcohol, or

(ii) a straight or branched chain, aliphatic, saturated or unsaturated alcohol concontaining 10 to 16 carbon atoms, or

(iii) a branched chain, aliphatic, unsaturated C_{20} alcohol, the molar ratio of said ethylene oxide to said alcohol being about 5:1 to about 30:1; and

(c) a monoethanolamide having an alkyl chain of 10 to 14 carbon atoms condensed with from 3 to 25 ethylene oxide units.

4,088,611

BUILDER FOR DETERGENT

Hiroshi Suzuki, Mitaka; Yukio Ito, Tokyo, and Yosiro Yasumoto, Fuchu, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,310
Claims priority, application Japan, Oct. 17, 1974, 49-119983
Int. Cl.[2] C11D *3/04*
U.S. Cl. 252—541 1 Claim

1. A detergent composition consisting essentially of a synthetic detergent and, as a builder for the detergent, an imidobissulfate having the formula $(NaSO_3)_2N \cdot Na$, said builder being present in an amount of from 20 to 500 parts by weight per 100 parts of the detergent.

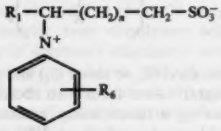
4,088,612

DETERGENT COMPOSITIONS

Malcolm Nigel Alan Carter, West Kirby; Brian McGhee, Thingwall; John Fielden Helliwell, Heswall; John Kerr Marshall, Little Neston, and Appayya Raghunath Naik, Port Sunlight, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 423,495, Dec. 12, 1973, abandoned, which is a continuation of Ser. No. 228,419, Feb. 22, 1972, abandoned, which is a continuation of Ser. No. 849,156, Aug. 11, 1969, abandoned. This application Jan. 4, 1977, Ser. No. 757,820
Claims priority, application United Kingdom, Aug. 15, 1968, 39103/68; Aug. 15, 1968, 39104/68
Int. Cl.[2] C11D *1/92, 1/94*
U.S. Cl. 252—545 15 Claims

1. A foam-forming detergent composition comprising
(a) at least one water soluble sulphobetaine having the structural formula:



wherein R_1 is an alkyl group containing from 8 to 16 carbon atoms, R_6 is selected from the group consisting of a hydrogen atom and a methyl group and n is an interger of at least 1 and not more than 2, and (b) at least one anionic detergent active surfactant selected from the group consisting of C_8–C_{16} alkyl sulphonates, and C_{10}–C_{16} alkyl sulphates, the molar ratio of the amount of the sulphobetaine to that of the anionic surfactant being from about 3:2 to 2:3 and wherein the total amount of sulphobetaine and anionic detergent active surfactant is in the range of from about 10 to about 50% by weight.

4,088,613

CATIONIC CHLORINE-RESISTANT POLYMERIC FLOCCULANTS AND THEIR USE

Richard G. Tonkyn, Cornwells Heights, and Norman Vorchheimer, Buckingham, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation-in-part of Ser. No. 487,503, Jul. 11, 1974, abandoned, which is a division of Ser. No. 393,361, Aug. 31, 1973, abandoned. This application Jan. 2, 1976, Ser. No. 646,298
Int. Cl.[2] C08G *23/12;* C02B *1/20*
U.S. Cl. 260—2 BP 13 Claims

1. A polyquaternary, cationic polymeric material comprising the reaction product of a caustic addition free aqueous mixture of an epihalohydrin, ammonia and a lower di-alkylamine, wherein said amine has from 1 to 3 carbons per alkyl group, wherein the amount of the ammonia ranges from about 15% to 33% of the total molar amount of the ammonia-amine concentration, wherein the ratio of the epihalohydrin to said ammonia-amine concentration is from about 0.9 up to the functional limit of said concentration, and wherein said polymeric material has a viscosity of from about 50 cps to about 4000 cps (Brookfield, spindle 1, 12 rpm) at a real solids content of from about 45% to about 55%.

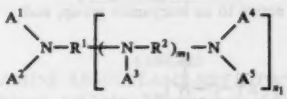
4,088,614

FLAME RESISTANT POLYURETHANE FOAM AND PROCESS FOR PRODUCING THE SAME

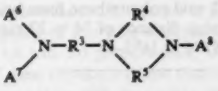
Shigeo Mori, and Takeshi Fujita, both of Kyoto, Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 483,339, Jun. 26, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,172
Claims priority, application Japan, Jun. 26, 1973, 48-72463; Oct. 1, 1973, 48-110799
Int. Cl.[2] C08G *18/14, 18/18, 18/20, 18/32*
U.S. Cl. 260—2.5 AJ 16 Claims

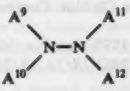
1. A process for producing a flame resistant rigid polyurethane foam comprising reacting a mixture consisting of (i) a polyetherpolyol and a polyesterpolyol, each having an active hydrogen atom, (ii) a polyisocyanate, said polyisocyanate being used in an amount of 0.5 to 3 equivalents per 1 equivalent of said polyetherpolyol and polyesterpolyol, (iii) at least one blowing agent selected from water and a volatile foaming agent, said water when present being used in an amount of less than about 5% by weight and said volatile foaming agent when present being used in an amount of less than about 70% by weight, said weights being based on the total weight of the starting materials, (iv) an emulsifying agent, said emulsifying agent being used in an amount of less than about 2% by weight based on the total weight of the starting materials, and (v) at least one amine compound selected from general formulae (I), (II), (III), (IV), (V), (VI), and (VII):


(I)

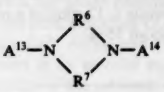
wherein A^1, A^2, A^3, A^4, and A^5 each represents a hydrogen atom or a monovalent organic group, wherein at least one of A^1 to A^5 being a hydrogen atom or an organic group which contains a hydrogen atom active to an isocyanate group; R^1 is a divalent organic group, a trivalent organic group or a tetravalent organic group; R^2 represents a divalent organic group; m_1 represents 0 or a positive integer smaller than 8; and n_1 represents 1, 2 or 3;


(II)

wherein A^6, A^7, and A^8 each represents a hydrogen atom or a monovalent organic group, with at least one of A^6 to A^8 being a hydrogen atom or an organic group which contains a hydrogen atom active to an isocyanate group; R^3, R^4 and R^5 each represents a divalent organic group;

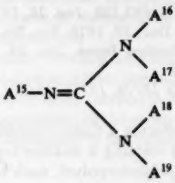

(III)

wherein A^9, A^{10}, A^{11}, and A^{12} each represents a hydrogen atom or a monovalent organic group, with at least one of A^9 to A^{12} being a hydrogen atom or an organic group which contains a hydrogen atom active to an isocyanate group;



(IV)

wherein A^{13} and A^{14} each represents a hydrogen atom or a monovalent organic group, with at least one of A^{13} and A^{14} being a hydrogen atom or an organic group which contains a hydrogen atom active to a isocyanate group and R^6 and R^7 each represents a divalent organic group;

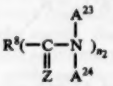


(V)

wherein A^{15}, A^{16}, A^{17}, A^{18}, and A^{19} each represents a hydrogen atom or a monovalent organic group, with at least one of A^{15} to A^{19} being a hydrogen atom or an organic group which contains a hydrogen atom active to an isocyanate group;

(VI)

wherein A^{20}, A^{21} and A^{22} each represents a hydrogen atom or a monovalent organic group, with at least one of A^{20} to A^{22} being a hydrogen atom or an organic group which contains a hydrogen atom active to an isocyanate group; and



(VII)

wherein R^8 represents a hydrogen atom, a monovalent organic group, a divalent organic group, or a trivalent organic group; A^{23} and A^{24} each represents a hydrogen atom or a monovalent organic group, at least one of said R^8, A^{23}, and A^{24} being a hydrogen atom or a group having a hydrogen atom active to an isocyanate group; Z represents an oxygen atom or a sulfur atom; and n_2 is an integer of 1 to 3, the weight ratio of said amine compound to said polyetherpolyol and polyesterpolyol being from 7:3 to 3:7, said polyurethane foam being self-extinguishing with a burning distance of 14 to 22 mm as tested in accordance with ASTM D 1692–68.

4,088,615

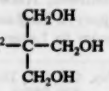
METHOD OF IMPROVING THE DIECUTTABILITY OF POLYESTER URETHANE FOAM AND THE IMPROVED DIECUTTABLE POLYESTER URETHANE FOAMS THEMSELVES

Michael Ray Sandner, Chappaqua, N.Y.; Walter Richard Rosemund, Englewood, N.J., and Ronald David Carey, Peekskill, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

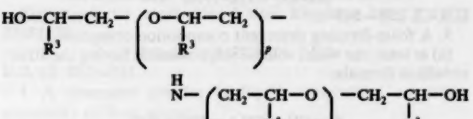
Filed Dec. 30, 1975, Ser. No. 645,401
Int. Cl.² C08G *18/14, 18/28*
U.S. Cl. 260—2.5 AM **39 Claims**

18. A polyester-based urethane foam, useful in the production of hair curlers, which comprises the product formed by simultaneously reacting and foaming a reaction mixture consisting essentially of: (a) a polyester polyol reactant containing an average of at least two hydroxyl groups per molecule; (b) a polyisocyanate reactant containing at least two isocyanate groups per molecule; (c) a blowing agent; (d) a catalyst for the reaction of (a) and (b); (e) a foam stabilizer and (f) as a diecuttability enhancing additive, a low molecular weight polyol selected from the groups consisting of (1) an aliphatic alcohol having the following structural formula:

wherein R_1 is hydrogen, alkyl (C_1 - C_8), or cycloalkyl (C_4 - C_8); R_2 is hydrogen or alkyl (C_1 - C_4); m and p are zero or integers and the sum of m and p is 8 or less; and n is an integer from 1 to about 4; (2) a low molecular weight polymethylol compound having the following structural formula:



wherein R^2 is hydrogen, lower alkyl (C_1 to about C_8) or methylol (CH_2OH); (3) an alkanolamine having the following structural formula:



wherein R^3 is H or alkyl (C_1 to about C_4) and p and q are zero or may have integral values from 1 to about 4; (4) alkylene oxide adducts having a functionality greater than 2 and a minimum hydroxyl number of about 100, and (5) mixtures thereof.

4,088,616

METHOD OF PRODUCTION OF A SHEET MATERIAL HAVING A SUPERIOR DURABILITY AND A SPONGE STRUCTURE

Hideziro Ichimura; Shizuo Tsuchiya, and Yoshihiro Tanba, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Mar. 12, 1976, Ser. No. 666,292
Claims priority, application Japan, Mar. 14, 1975, 50-30860; Mar. 14, 1975, 50-30861
Int. Cl.² C08J *9/28*
U.S. Cl. 260—2.5 AY **5 Claims**

1. In the production of a sheet material by a coagulation treatment of a solution of polyurethane elastomer, which is synthesized from a polymeric glycol selected from the group consisting of polyether glycols, polylactone glycols and polycarbonate glycols as the soft segment, an organic diisocyanate and a chain extender, wherein the nitrogen content in the elastomer originating from the isocyanate group is in the range of 2.5 to 7 wt. % based upon the total weight of polyurethane elastomer, in a coagulation bath, a method for production of a sheet material having a superior durability and a sponge structure, which is characterized by using, as the polyurethane elastomer

(1) a polyurethane elastomer which contains at least two polymeric glycols which are homologous chemically but differ in molecular weights, each in the amount of at least 5 to 95 weight % based upon the total amount of polymeric glycols, as soft segments of the polyurethane elasto-

mer, wherein the molecular weight of each of said polymeric glycols is in the range of 500 to 4000 and the difference of molecular weights between each of said polymeric glycols is in the range of 100 to 3500, or

(2) a mixture of at least two polyurethane elastomers which are synthesized from the same chemical components; namely, a polymeric glycol as the soft segment whose molecular weight is 500 to 4000, an organic diisocyanate and a chain extender, wherein the content of nitrogen in each of these elastomers originating from the isocyanate group is 2 to 7.5 wt. %, the difference in said nitrogen content between each of said elastomers is in the range of 0.2 to 4.0 wt. %, and the amount of each elastomer in the mixture ranges from 5 to 95 wt., % so as to obtain a mean content of nitrogen originating from the isocyanate group of from 2.5 to 7.0 wt. % in the blended mixture,

and in which the coagulation bath comprises a mixture of a solvent and a non-solvent for the polyurethane elastomer, the weight ratio of the solvent and non-solvent being in the range of 20:80 to 70:30.

4,088,617

PHONOGRAPHIC RECORD MOLDING COMPOSITION

Dale Skalla, Cicero; William C. Meisenhelder, Downers Grove, and Henry Alsberg, Northbrook, all of Ill., assignors to The Richardson Company, Des Plaines, Ill.

Filed May 19, 1976, Ser. No. 688,070
Int. Cl.[2] C08L *91/00*
U.S. Cl. 260—23 ST **21 Claims**

18. A phonograph record molding composition consisting essentially of from about 90 to about 98 weight percent of a vinyl aromatic/acrylic ester copolymer selected from the group consisting of styrene/2-ethylhexyl acrylate and styrene/stearyl methacrylate, wherein the weight ratio of vinyl aromatic to acrylic ester is from about 10:1 to 40:1, from about 1 to 9 weight percent of a wax component, and from about 0.1 to 3 percent of a lubricant component, said phonograph recording molding composition being either compression or injection moldable and having a wear resistance greater than polystyrene injection moldable phonograph record compositions.

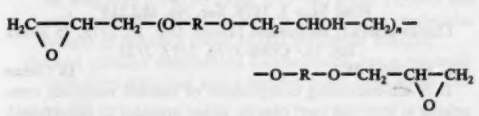
4,088,618

ROSIN-MODIFIED EPOXY RESINS

Ronald Saltzman, Morris Plains; William J. Ferrara, Hackensack, and Olgierd Wasilewski, Edison, all of N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,835
Int. Cl.[2] C08L *93/04;* C08F *2/46*
U.S. Cl. 260—24 **3 Claims**

1. A rosin-modified epoxy resin prepared by heating at a temperature of about 140°-220° C. (a) an epoxy resin having the formula



wherein R is the divalent hydrocarbon radical of the dihydric phenol and *n* is an integer of at least 1 and (b) tail oil rosin, hydrogenated wood rosin, dehydrogenated wood rosin, polymerized wood rosin, or gum rosin, the equivalent ratio of rosin acid to epoxy resin being about 0.85–1:1.

4,088,619

WATER-DISPERSIBLE, POLYESTER-BASED COATINGS FORMULATIONS AND METHOD OF MAKING SAME

Edward Julius Holzrichter, Riverside, Calif., assignor to Whittaker Corporation, Los Angeles, Calif.

Filed Jan. 31, 1977, Ser. No. 764,115
Int. Cl.[2] C08L *61/20*
U.S. Cl. 260—29.4 R **13 Claims**

1. The method of making an improved liquid coatings formulation, said method comprising the steps:

(a) esterifying a mixture of saturated aliphatic diol and aromatic dicarboxylic acid and/or anhydride thereof, in a mole ratio of diol-to-acid and/or anhydride thereof of about 1.25–1.5:1 at a first elevated temperature until an acid number below about 10 (in mg. of KOH) is obtained on the non-volatile materials so as to form an intermediate reaction product;

(b) reacting said intermediate reaction product with an amount of aromatic dicarboxylic acid anhydride sufficient to increase the acid number of the resulting reaction product to about 35–75, said reaction being effected at a second elevated temperature lower than said first elevated temperature but sufficient to effect opening of the ring of said anhydride for esterification of only one carboxyl group thereof, said reaction resulting in a finished polyester resin having a molecular weight of about 700–2,000, an hydroxyl number of about 40–60, said acid number of about 35–75 and reactive pendant carboxyl and hydroxyl groups, said pendant hydroxyl groups being present in a concentration not in excess of about 2 per molecule; and,

(c) thereafter mixing said finished polyester resin with solvent comprising water and an aminoplast resin to form an improved liquid coatings formulation.

4,088,620

MELAMINE RESIN FLAME-RETARDANT FIBERS

Yutaka Nihongi, and Nobuo Yasuhira, both of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Division of Ser. No. 424,629, Dec. 13, 1973, abandoned. This application Dec. 5, 1975, Ser. No. 638,098
Claims priority, application Japan, Dec. 28, 1972, 45-483856
Int. Cl.[2] C08L *61/28;* C08G *12/32*
U.S. Cl. 260—29.4 UA **19 Claims**

1. A bi-component, flame retardant, lightfast, thermally infusible, essentially smokeless, substantially uniform denier fiber exhibiting a substantially homogeneous cross-section along its longitudinal axis, said fiber having a degree of water swelling of less than about 2.0, a denier of between about 0.5 to 1000, birefringence of less than about 0.02, a tenacity of between about 1.6 and 5.0 grams/denier, whiteness of greater than about 0.7, heat shrinkage of less than 10% at 300° C., said fiber including at least 60% by weight of a first component which comprises a cured, amine/aldehyde thermosetting precondensate, said amine/aldehyde thermosetting pre-condensate being water soluble and having a degree of hydroxyalkylation of between about 1.5 and 6, said thermosetting pre-condensate being comprised of at least 60% by weight amine/aldehyde condensable comonomers and up to 40% of a third comonomer co-condensable therewith, and the amine comonomer comprising said pre-condensate being selected from the group consisting of melamine, N-substituted melamine, guanamine, substituted guanamine, and mixtures thereof; and from 0.02 to 40% by weight of a second component which comprises a thermoplastic, fiber-forming, water-soluble polyvinyl alcohol resin compatible with the component amine/aldehyde thermosetting pre-condensate, said polyvinyl alcohol resin having a degree of polymerization of from 500 to 3200 and a degree of saponification of from 75 to 100 mole %.

4,088,621
COATING COMPOSITIONS

Russell C. Miller, Chicago, Ill., assignor to J. M. Eltzroth & Associates, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 505,212, Sep. 12, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,726
Int. Cl.² C08L *33/04*
U.S. Cl. 260—29.6 S **6 Claims**

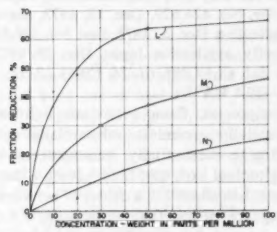
1. A coating composition consisting essentially of:

Ingredients	Weight %
(a) resin solids of at least one organic film forming resin selected from the group consisting of thermoplastic resins, thermosetting resins, and mixtures thereof	10 - 60
(b) silicofluoride of calcium, magnesium, strontium or barium	0.5 - 20
(c) hexavalent inorganic chromium compound as Cr	0 - 10
(d) pigments and pigment extenders other than (b)	0 - 100 of resin
(e) driers	up to 0.5 of total solids
(f) coalescent agents	0.05 - 10
(g) dispersants	0.05 - 6
(h) defoamers	0 - 0.05
(i) surfactants	0.01 - 3
(j) thickening agents	trace to 10.0% by weight of resin
(k) water including water soluble additives added to enhance stability	5 - 65.

4,088,622
MOLDED DRAG REDUCTION COATINGS

Harry A. Pearl, Middletown, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 25, 1976, Ser. No. 699,923
Int. Cl.² C08K *5/07*
U.S. Cl. 260—32.8 R **6 Claims**



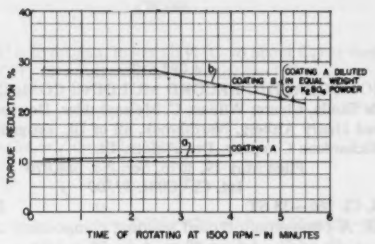
1. An improved molded drag reduction coating comprising:
100 parts by weight of polyethylene oxide polymer in powder form having a molecular weight of 4×10^6 molded together with 0.5 parts by weight of 4, 4' thio-bis (6-tert-butyl meta cresol) in 20 c.c. of acetone at a temperature of 300° F and a pressure of 415 psi.

6. A method of making an improved drag reduction coating including the steps of:
mixing uniformly a powder of a first polyethylene oxide polymer of molecualr weight 4×10^6 with 4.8 percent of weight solution of 4, 4' thio-bis (6-tert-butyl meta cresol) in sorbitan monolaurate of theoretical molecular weight 1226 and anisole (methyl phenyl ether) in a fixed ratio by weight forming a mixture;
calendering a second polyethylene oxide polymer of molecular weight 9×10^5 into a film of thickness 1.7 mils;
distributing said mixture over the film of said second polyethylene oxide polymer in a mold cell;
heating said mold cell to a temperature of 230° F under pressure of 500 psi; and
cooling said mold cell under pressure to form the improved molded coating.

4,088,623
COATINGS THAT REDUCE FLOW RESISTANCE AND TURBULENT DRAG AT THEIR INTERFACE WITH LIQUIDS

Harry A. Pearl, Middletown, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 28, 1976, Ser. No. 700,373
Int. Cl.² C08L *63/00*; B63B *1/34*
U.S. Cl. 260—37 AL **3 Claims**


TORQUE REDUCTION %
COATING A DILUTED WITH EQUAL WEIGHT OF Fe_2O_3 POWDER
COATING B
COATING A
TIME OF ROTATING AT 1500 RPM - IN MINUTES

1. A molded coating formulation for covering the outer surface of a body moving in water to reduce the drag encountered at and contiguous to the interface thereof, said coating formulation consisting essentially of
96 parts by weight polyethylene oxide polymer powder of molecular weight 4×10^6;
15 parts by weight polyethylene oxide polymer powder of molecular weight 9×10^5;
9 parts by weight 4.8 percent by weight solution of 4,4" thio-bis (6-tert-butyl meta cresol) in polyoxyalkylene sorbitan monolaurate of theoretical molecular weight 1226; and
120 parts by weight of a neutral water soluble salt.

4,088,624
SELF-HARDENING MOLDING COMPOSITIONS

Asita Bhattacharyya, Senlis; Michel Jean-Claude Dormoy, Chantilly, and Gerard Yves Richard, Precy sur Oise, all of France, assignors to Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C., Asnieres, France

Filed May 3, 1976, Ser. No. 682,214
Claims priority, application France, Dec. 26, 1975, 75 39802
Int. Cl.² C08K *3/16, 5/13, 5/55*
U.S. Cl. 260—38 **18 Claims**

1. A self-hardening composition of molded materials comprising at least one inert charge, either granular or pulverulent, intimately mixed with at least one organic resin as a binding agent, and with at least one acid or alkaline agent for the hardening of the binder, said composition containing between about 0.01 to 5% by weight, with reference to said binding agent, of fluoride ions, said amount being sufficient to catalyze the hardening of said resin.

4,088,625

PROCESS FOR THE PRODUCTION OF A PULVERULENT, TRICKLABLE MIXTURE OF ETHYLENE/VINYL ACETATE COPOLYMER AND POWDERY POLYVINYLCHLORIDE

Erwin Gubisch; Walter Kudlich; Walter Popp, and Herbert Reinicke, all of Burghausen, Germany, assignors to Wacker Chemie GmbH, Munich, Germany

Filed Aug. 20, 1976, Ser. No. 716,106
Claims priority, application Germany, Sep. 10, 1975, 2540378
Int. Cl.[2] C08L *23/08*
U.S. Cl. 260—42 6 Claims

1. A process for the production of a pulverulent, tricklable mixture of ethylene/vinyl acetate copolymer and polyvinylchloride comprising the steps of mixing a mixture consisting essentially of (a) an ethylene/vinyl acetate copolymer having an acetate content of from 15% to 75% by weight, (b) powdery polyvinylchloride, in a mixture ratio of (a) to (b) of 1:3 to 2:1, and (c) from 0 to 5% by weight of the mixture of additives customary for polymer processing, in a high-speed mixture at temperatures above the softening temperature of said polyvinylchloride and below 170° C, for a time sufficient to effect homogenization, quenching said homogenized mixture with water and removing the water, grinding the quenched product with the addition of from 0.5 to 10 parts by weight of an inert powder having particles in the submicroscopic range, in a high speed mill under passage of an airstream which is heated by friction, and recovering said pulverulent, tricklable mixture; as well as the powdery mixture so produced.

4,088,626

MULTICOMPONENT POLYSULFONE-BLOCK COPOLYMER-POLYMER BLENDS

William P. Gergen, and Sol Davison, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 693,463, Jun. 7, 1976, abandoned. This application May 5, 1977, Ser. No. 794,199
Int. Cl.[2] C08K *7/14;* C08L *51/00, 53/00*
U.S. Cl. 260—42.18 19 Claims

1. A composition comprising the admixture obtained by intimately mixing about 4 to about 40 parts by weight of a block copolymer, about 5 to about 48 parts by weight of at least one dissimilar engineering thermoplastic, and a primary engineering thermoplastic resin selected from the group consisting of poly(aryl polyethers) and aromatic polysulfones in a weight ratio of primary engineering thermoplastic to dissimilar engineering thermoplastic of greater than 1:1, so as to form a polyblend wherein at least two of the polymers have at least partial continuous interlocked networks with each other and wherein:

(a) said block copolymer comprises at least two monoalkenyl arene polymer end blocks A and at least one substantially completely hydrogenated conjugated diene polymer mid block B, said block copolymer having an 8 to 55 percent by weight monoalkenyl arene polymer block content, each polymer block A having an average molecular weight of between about 5,000 and about 125,000, and each polymer block B having an average molecular weight of between about 10,000 and about 300,000;

(b) said primary engineering thermoplastic has a generally crystalline structure and a melting point over about 120° C; and

(c) said dissimilar engineering thermoplastic resin is capable of forming a continuous structure and is selected from the group consisting of polyamides, polyolefins, thermoplastic polyesters, polycarbonates, acetal resins, thermoplastic polyurethanes, halogenated thermoplastics, and nitrile barrier resins.

4,088,627

MULTICOMPONENT POLYURETHANE-BLOCK COPOLYMER BLENDS

William P. Gergen, and Sol Davison, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 693,463, Jun. 7, 1976, abandoned. This application May 5, 1977, Ser. No. 794,200
Int. Cl.[2] C08K *7/14;* C08L *51/00, 53/00*
U.S. Cl. 260—42.18 12 Claims

1. A composition comprising the admixture obtained by intimately mixing about 4 to about 40 parts by weight of a block copolymer, about 5 to about 48 parts by weight of at least one dissimilar engineering thermoplastic, and a thermoplastic polyurethane in a weight ratio of polyurethane to dissimilar engineering thermoplastic of greater than 1:1, so as to form a polyblend wherein at least two of the polymers have at least partial continuous interlocked networks with each other and wherein:

(a) said block copolymer comprises at least two monoalkenyl arene polymer end blocks A and at least one substantially completely hydrogenated conjugated diene polymer mid block B, said block copolymer having an 8 to 55 percent by weight monoalkenyl arene polymer block content, each polymer block A having an average molecular weight of between about 5,000 and about 125,000, and each polymer block B having an average molecular weight of between about 10,000 and about 300,000;

(b) said thermoplastic polyurethane has a generally crystalline structure and a melting point over about 120° C; and

(c) said dissimilar engineering thermoplastic resin is capable of forming a continuous structure and is selected from the group consisting of poly(aryl ethers), poly(aryl sulfones) polycarbonates and acetal resins.

4,088,628

ATACTIC POLYPROPYLENE TAPE

Philip Bernstein, Yardley, and James P. Coffey, Hatboro, both of Pa., assignors to ESB Incorporated, Phila., Pa.

Filed Aug. 12, 1976, Ser. No. 713,683
Int. Cl.[2] H01M *2/08, 10/54;* C08K *3/04, 5/01*
U.S. Cl. 260—42.46 5 Claims

1. A tape consisting essentially of

(a) 95 – 60% by weight atactic polypropylene, and

(b) 5 – 40% by weight non-conductive carbon black having particles of a size capable of passing through a 70 mesh sieve.

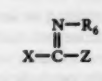
4,088,629

STABILIZATION OF SYNTHETIC POLYMERS

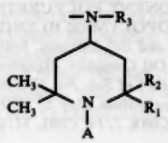
Paul Uhrhan; Reinhard Lantzsch, both of Cologne; Harald Oertel; Ernst Roos, both of Odenthal, and Dieter Arlt, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed Oct. 6, 1976, Ser. No. 730,201
Claims priority, application Germany, Oct. 11, 1975, 2545647
Int. Cl.[2] C08K *5/34*
U.S. Cl. 260—45.8 N 8 Claims

1. A process for stabilizing a synthetic polymer which comprises adding to the polymer a stabilizing amount of a compound of the formula:



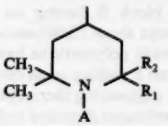
or a tautomer thereof wherein X is of the formula:



wherein A is hydrogen, alkyl having 1 to 20 carbon atoms, alkenyl or alkinyl having 3 to 12 carbon atoms, aralkyl having 7 to 12 carbon atoms or $—CH_2—CHR_4—OH$ wherein R_4 is hydrogen, methyl or phenyl;

R_1 and R_2 are the same or different and are each alkyl having 1 to 12 carbon atoms or R_1 and R_2 together with the ring carbon atom to which they are attached form a cycloalkyl ring with 5 to 12 ring carbon atoms;

R_3 is hydrogen, alkyl having b 1 to 20 carbon atoms, cycloalkyl having 5 to 12 carbon atoms, aralkyl having 7 to 12 carbon atoms, β-cyanoethyl, β-alkoxy carbonyl ethyl having 1 to 3 carbon atoms in the alkoxy moiety, aryl having 6 to 14 carbon atoms, $—CH_2—CHR_4—OH$ wherein R_4 is hydrogen, methyl or phenyl, or



wherein A, R_1 and R_2 are as defined above;

Z has the same meaning as X or is —NUV wherein U and V are the same or different and are each hydrogen, alkyl having 1 to 20 carbon atoms, cycloalkyl having 5 to 12 carbon atoms, aralkyl having 7 to 12 carbon atoms or aryl having 6 to 14 carbon atoms, or said aryl substituted by alkyl having 1 to 8 carbon atoms, alkoxy having 1 to 4 carbon atoms, hydroxy, nitro, chlorine or by bromine and wherein the radical U may also be R_5-W wherein R_5 is aryl having 6 or 10 ring carbon atoms, said aryl substituted by chlorine, bromine, methyl or by methoxy, alkyl having 1 to 8 carbon atoms or aralkyl having 7 to 12 carbon atoms;

W is —CO or $—SO_2$ and R_6 is hydrogen, alkyl having 1 to 20 carbon atoms, cycloalkyl having 5 to 7 carbon atoms, aralkyl having 7 to 12 carbon atoms, aryl having 6 to 14 carbon atoms or said aryl substituted by alkyl having 1 to 8 carbon atoms, alkoxy having 1 to 4 carbon atoms, hydroxy, nitro, chlorine or by bromine.

4,088,630

CYCLIC ACETALS OF POLYOLS, THEIR PRODUCTION AND THEIR USE AS NON-DISCOLORING ANTI-OZONANTS

Ernst Roos, Odenthal-Osenau; Günter Langner, Leverkusen; Theo Kempermann, Cologne, and Wolfgang Redetzky, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

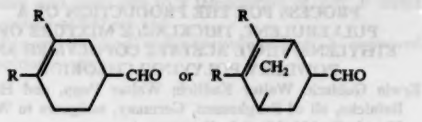
Filed Oct. 26, 1976, Ser. No. 735,394

Claims priority, application Germany, Oct. 31, 1975, 2548911

Int. Cl.² C08K *5/15*

U.S. Cl. 260—45.8 A **41 Claims**

1. A composition comprising a natural and/or synthetic rubber stabilized with an ozone resistant amount of a condensation product of at least one member selected from the group consisting of triols, tetraols, pentaols and hexaols and a compound of the formula



wherein R is the same or different and is hydrogen or methyl, said condensation product being in a molar ratio of 1:1 to 1:3 and having all the aldehyde groups thereof present in acetalated form.

4,088,631

POLYMERS STABILIZED WITH CARBOXYLIC ACID AMIDES

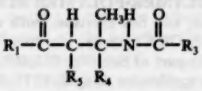
Syed K. Mowdood, Akron, Ohio, assignor to The Goodyear Tire and Rubber Company, Akron, Ohio

Division of Ser. No. 663,391, Mar. 3, 1976, Pat. No. 4,048,227, which is a continuation of Ser. No. 548,481, Feb. 10, 1975, abandoned, which is a continuation of Ser. No. 355,628, Apr. 30, 1973, abandoned, which is a continuation of Ser. No. 159,046, Jul. 1, 1971, abandoned. This application Jul. 5, 1977, Ser. No. 812,980

Int. Cl.² C08K *5/20*

U.S. Cl. 260—45.9 NC **5 Claims**

1. An admixture of an amide in a photochemical and thermo-oxidative stabilizing amount with at least one thermoplastic polymer selected from polyvinyl chloride, polyethylene, polypropylene, polystyrene, polybutadiene, polyacrylonitrile and polymethacrylonitrile, where said amide is selected from the group consisting of N-(1,3-diphenyl-1-methyl-3-oxo-propyl-)acetamide, N-(1,3-diphenyl-1-methyl-3-oxo-propyl)4'-(salicyloyl)benzamide, N-(1,3-diphenyl-1-methyl-3-oxo-propyl)benzamide and amides having the structure:



where R_3 is selected from methyl, ethyl, propyl, pentyl, hexyl, heptyl and octyl radicals, where R_1 is a radical selected from 2'-hydroxy benzophenone, 4'-octyl benzophenone, 2'-hydroxy-4'-octyl benzophenone and ortho hydroxy-p-octyl phenyl, R_4 is selected from the radicals of R_4 and from aliphatic hydrocarbon radicals having 1–8 carbon atoms and R_5 is selected from hydrogen and methyl radicals.

4,088,632

PROCESS FOR THE PRODUCTION OF ACRYLATE SILICATE COMPOUNDS AND RESINOUS PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 703,925, Jul. 9, 1976, abandoned. This application Jun. 30, 1977, Ser. No. 811,533

Int. Cl.² C08G *77/04*; C07F *7/08*

U.S. Cl. 260—46.5 R **12 Claims**

1. The production of acrylate silicate resinous products by the following steps:

(a) mixing about 3 to 4 parts by weight of an acrylate compound, 0.005 to 0.02 parts by weight of an emulsifier, and about 0.5 to 1 part by weight of an alkali catalyst in water;

(b) adding about 2 parts by weight of a fine granular hydrated silica ($SiO_2.xH_2O$);

(c) heating the mixture to 80° to 100° C while agitating at ambient pressure for 10 to 30 minutes;

(d) adding a catalytic amount of a peroxide initiator;

(e) heating the mixture to 80° to 100° C while agitating at ambient pressure for 10 to 60 minutes thereby

(f) producing an emulsion of an acrylate silicate resinous product.

4,088,633

METHOD OF MARKING PAVED SURFACES AND CURABLE TWO-PART EPOXY SYSTEMS THEREFOR

Richard S. Gurney, Roseville, Minn., assignor to H. B. Fuller Company, St. Paul, Minn.

Filed Nov. 26, 1975, Ser. No. 635,694
Int. Cl.[2] C08G *59/56;* C08L *63/02*
U.S. Cl. 260—47 EN 5 Claims

1. A two-part coating system capable of forming a hard coating, said coating system consisting essentially of:

(a) in a first part, a pigmented liquid curable vicinal epoxide composition comprising a polyglycidyl ether of a polyhydric phenol, said polyglycidyl ether having an average epoxide functionality greater than 1 but less than 3 and an epoxide equivalent weight greater than 150 but less than 1000; said first part further comprising a glycidyl or polyglycidyl ether of an aliphatic mono-ol or polyol as a viscosity reducing, reactive diluent for said first part;

(b) in an active hydrogen-containing, epoxide-reactive second part, a blended co-reactant for said first part, said blended co-reactant consisting essentially of an amine-epoxy adduct and the following difunctional amines:

$H_2N—R—NH_2$, and

$H_2N—CH_2—A—CH_2—NH_2$,

wherein R represents a branched alkylene moiety and

A represents a divalent cycloaliphatic group; said difunctional amines being blended in a weight ratio ranging from 10:90 to about 90:10; said amine-epoxy adduct comprising 5–75% by weight of a reaction product of the components comprising a said difunctional amine, a diglycidyl ether of a dihydric phenol, and an alkyl-substituted monohydric phenol;

said two-part coating system being substantially free of non-reactive, essentially volatile organic liquid diluents and containing a silane adhesion promoter.

4,088,634

PROCESS FOR ISOLATION AND PURIFICATION OF POLYPHENYLENE ETHERS

Glenn Dale Cooper, Delmar, and James Wilson Watson, Jr., New City, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 9, 1976, Ser. No. 748,741
Int. Cl.[2] C08G *65/44, 65/45*
U.S. Cl. 260—47 ET 21 Claims

1. In a process for forming a polyphenylene ether by an oxidative coupling reaction in the presence of a metal ion-amine complex catalyst comprising passing an oxygen containing gas through a reaction solution of a phenol and said metal-ion amine catalyst, the improvement which comprises separating the polyphenylene ether by admixing said solution with a mixture of acetone and a minor proportion of water.

4,088,635

POLYESTER MANUFACTURE

Anthony Arthur Briarly Browne, and James Eric McIntyre, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Dec. 22, 1975, Ser. No. 643,085
Claims priority, application United Kingdom, Jan. 13, 1975, 1349/75
Int. Cl.[2] C08G *63/00*
U.S. Cl. 260—78.41 18 Claims

1. A process for the manufacture of a poly(alkylene arylene dicarboxylate) wherein an aromatic dicarboxylic acid in the solid state is reacted with an alkylene oxide to form a poly-(alkylene arylene dicarboxylate), reaction conditions being so controlled that throughout the reaction a major part of the reaction mass forms a solid phase, wherein the esterification reaction is catalysed by the presence of phosphorous acid or the reaction product of phosphorous acid with a constituent or constituents of the reaction mixture.

4,088,636

2,2'-DITHIODIANILINE CURED POLYURETHANE

Michael E. Kimball, Norton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 16, 1974, Ser. No. 533,408
Int. Cl.[2] C08G *18/32*
U.S. Cl. 260—77.5 AM 1 Claim

1. A method of making a polyurethane substantially free of unreacted NCO and having improved physical properties consisting essentially of forming a prepolymer prepared by reaction of a polyether polyol of 2 to 4 hydroxyls of 700 to 6500 molecular weight and 3,3'-dimethyldiphenyl-methane-4,4'-diisocyanate, said prepolymer having from 3 to 8 percent free NCO, then reacting the prepolymer in the presence of 0.01 to 0.5 equivalents of triethylene diamine per equivalent of free NCO with 2,2'-dithiodianiline on the basis of 0.5 to 1.1 equivalents of amino per equivalent of excess NCO at a temperature of 55° to 120° C.

4,088,637

PROCESS FOR THE PRODUCTION OF POLYCONDENSATES CONTAINING IMIDE GROUPS

Wilfried Zecher; Willi Dünwald, and Rudolf Merten, all of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwelk, Germany

Filed Sep. 22, 1976, Ser. No. 725,381
Claims priority, application Germany, Sep. 25, 1975, 2542706
Int. Cl.[2] C08G *18/80, 18/78*
U.S. Cl. 260—77.5 TB 14 Claims

1. In the process for the production of a polycondensate coupled through imide groups by condensing a polycarboxylic acid anhydride with a polyisocyanate and a member selected from the group consisting of a lactam and a polyol, the improvement wherein 1 – 60% of the total quantity of isocyanate is in the form of an isocyanurate substituted with masked isocyanate groups.

4,088,638

METHOD AND APPARATUS FOR RECOVERING SAPONIFIED OIL

Jerry Zucker, Lake Como, Fla., assignor to Hudson Pulp & Paper Corp., New York, N.Y.

Continuation-in-part of Ser. No. 672,836, Apr. 1, 1976. This application Aug. 4, 1976, Ser. No. 711,619
Int. Cl.[2] C09F *5/10*
U.S. Cl. 260—97.5 7 Claims

1. A process for removing tall oil soap particles from the black liquor formed in a wood pulping process which comprises the steps of, continuously supplying a stream of black liquor to a first container; producing an aerated foam in said container by whipping the black liquor in said first container in the presence of air to agglomerate soap particles in the black liquor into soap particles of substantially larger size and to foam the black liquor; removing only aerated foam from said first container near the top of the first container; deaerating said foam removed from said first container to produce a mixture of liquid and buoyant agglomerated soap particles; directing said liquid and soap particles to a second container wherein the soap particles are permitted to float to the top of said second container and thereafter skimming soap particles from the top of said second container while draining liquid from the bottom of the second container.

4,088,639
MACROMOLECULAR ADENINE NUCLEOTIDE DERIVATIVES

Piergiorgio Zappelli, Monterotondo; Luciano Re, Rome, and Walter Marconi, San Donato Milanese, all of Italy, assignors to Snamprogetti, S.p.A., Milan, Italy

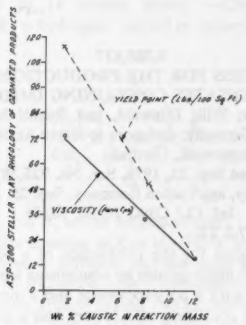
Filed Jun. 12, 1975, Ser. No. 586,354
Claims priority, application Italy, Jun. 12, 1974, 23900
Int. Cl.[2] C07H *19/20*
U.S. Cl. 260—112.5 R 3 Claims

2. 4-(6-nicotinamide adenine dinucleotide)-3-hydroxybutyril poly-L-lysine.

4,088,640
OZONATED LIGNOSULFONATES

William John Detroit, Schofield, Wis., assignor to American Can Company, Greenwich, Conn.

Filed Jun. 18, 1976, Ser. No. 697,541
Int. Cl.[2] C07G *1/00*
U.S. Cl. 260—124 R 30 Claims


ASP-200 STELLER CLAY RHEOLOGY OF OZONATED PRODUCTS
YIELD POINT (Lbs/100 Sq Ft)
VISCOSITY (Poises Cps)
WT. % CAUSTIC IN REACTION MASS

1. An ozonated composition comprising:

a lignosulfonate that has been subjected to ozone oxidation in an aqueous alkaline medium;

said ozonated lignosulfonate containing, by weight, between 2 percent and 20 percent of total added combined oxygen in the oxidized lignosulfonate product,

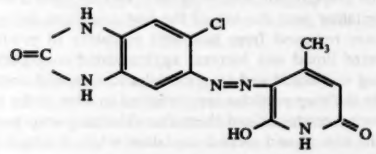
said composition characterized in being substantially completely soluble in aqueous saline solutions and aqueous sulfuric acid solutions at pH ranges below 7 and as low as about 1.5.

4,088,641
4-METHYL-5-(BENZIMIDAZOLONYLAZO)-6-HYDROXYPYRIDONE-2 PIGMENT

Stefan Hari, Allschwil; Rolf Müller, Aesch, and Rudolf Mory, Dornach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,155
Claims priority, application Switzerland, Feb. 21, 1975, 2238/75
Int. Cl.[2] C09B *29/36*; C09D *11/00*; D06P *1/44, 1/52*
U.S. Cl. 260—156 1 Claim

1. The azo pigment of the formula



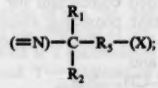
4,088,642
COMPOUNDS HAVING BOTH PEROXY AND ALIPHATIC AZO GROUPS

Chester Stephen Sheppard, Tonawanda; Ronald Edward MacLeay, Williamsville, both of N.Y., and Richard Anthony Bafford, Aiken, S.C., assignors to Pennwalt Corporation, Philadelphia, Pa.

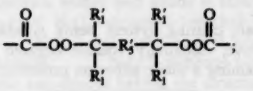
Division of Ser. No. 37,310, May 14, 1970, Pat. No. 3,812,095, which is a continuation-in-part of Ser. No. 703,241, Feb. 6, 1968, abandoned. This application Oct. 24, 1973, Ser. No. 409,130
Int. Cl.[2] C07C *107/02*
U.S. Cl. 260—174 6 Claims

1. A compound, having idependent peroxidic and aliphatic azo groups. of the formula $(R—N{=}N—R'—)_2X$ where:

(1) R′ is

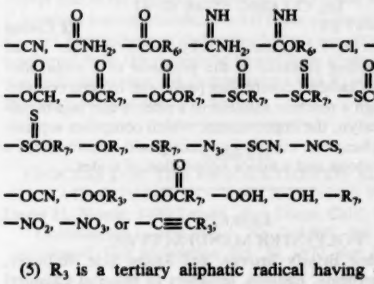


(2) X is a peroxy containing diradical selected from —C(=O)OOC(=O)—, —OC(=O)OOC(=O)O— and



(3) R_1 and R_1' can be the same or different and are alkyl or cycloalkyl radicals having 1–10 carbon atoms;

(4) R_2 is selected from



(5) R_3 is a tertiary aliphatic radical having 4–10 carbon atoms;

(6) R_5 and R_5' may be the same or different and are aliphatic diradicals having 1–20 carbons optionally containing in the backbone structure one or more non-adjacent oxygen, sulfur or nitrogen atoms; aromatic diradicals having 6–12 carbons; or aromatic-aliphatic diradicals having 7–20 carbons optionally containing in the backbone structure one or more non-adjacent oxygen, sulfur or nitrogen atoms;

(7) R_6 is a lower alkyl radical;

(8) R_7 is an alkyl or cycloalkyl radical of 1–10 carbons or an aromatic radical of 6–12 carbons;

(9) R_1 and R_5 together with the tertiary carbon atoms in R′ can form a cycloalkyl triradical of 3–10 carbons; and

(10) R is a tertiary aliphatic radical of 4–10 carbons.

4,088,643

PROCESS FOR THE PRODUCTION OF AZODICARBONAMIDE

Siegfried Böhm, and Karlfried Wedemeyer, both of Colonge, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 12, 1976, Ser. No. 731,477
Claims priority, application Germany, Oct. 30, 1975, 2548592
Int. Cl.² C07C *107/02*; C01B *7/00*
U.S. Cl. 260—192 14 Claims

1. In a process for the preparation of azodicarbonamide by oxidation of hydrazodicarbonamide in an aqueous solution with hydrogen peroxide, the improvement which comprises carrying out the process in the presence of iodine at a temperature of between 50° and 95° C while the reaction mixture is maintained at a pH in the range of from 1.0 to 5.0.

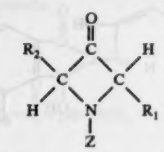
4,088,644

N-ACYL-3-AZETIDINONE

Elijah H. Gold, West Orange, N.J., assignor to Schering-Corporation, Kenilworth, N.J.

Division of Ser. No. 237,931, Mar. 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 741,205, Jun. 28, 1968, abandoned. This application Mar. 20, 1974, Ser. No. 452,871
Int. Cl.² C07D *205/06, 205/04*
U.S. Cl. 260—239 A 2 Claims

1. A compound having the structural formula:



wherein R_1 and R_2 are each hydrogen or lower alkyl; and Z is an acyl moiety derived from a carboxylic acid or sulfonic acid by removal of the hydroxyl group.

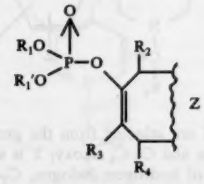
4,088,645

O,O-DIALKYLPHOSPHORYLOXY-2,3,5,8-TETRAHYDRO-1H-s-TRIAZOLO[1,2a]PYRIDAZINE-1,3-DIONES

Kaspar F. Burri, West Caldwell, N.J.; Frank Kienzle, Therwill, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 618,853, Oct. 2, 1975, Pat. No. 4,025,584, which is a division of Ser. No. 497,598, Aug. 15, 1974, Pat. No. 3,933,948. This application Feb. 7, 1977, Ser. No. 766,093
Int. Cl.² C07D *9/65*
U.S. Cl. 544—232 4 Claims

1. A compound of the formula



wherein each of R_1 and R_1' is lower alkyl, aryl or benzyl, each of R_2, R_3 and R_4 is hydrogen or lower alkyl and Z is the residue of a dienophile moiety selected from the group consisting of 4-phenyl-1,2,4-triazoline-3,5-dione.

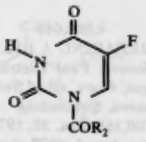
4,088,646

5-FLUOROURACIL DERIVATIVES

Torao Ishida; Daikichi Nishimura; Toshiaki Sugawara, and Tadaaki Ooka, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jan. 22, 1976, Ser. No. 651,370
Claims priority, application Japan, Jan. 22, 1975, 50-9469; Jan. 22, 1975, 50-9470
Int. Cl.² C07D *239/22*
U.S. Cl. 544—313 3 Claims

1. A compound represented by the formula:



wherein R_2 represents alkyl or alkenyl having 9 to 23 carbon atoms.

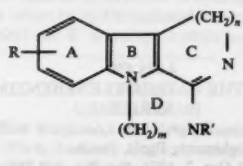
4,088,647

PYRAZINO (1,2,3-ab)-β-CARBOLINE DERIVATIVES AND SALTS THEREOF AND METHOD OF PREPARING SAME

Robert Georgievich Glushkov, ulitsa Gorkogo, 43, kv. 90; Mikhail Davydovich Mashkovsky, Leningradsky prospekt, 75a, kv. 55; Natalia Ivanovna Andreeva, Frunzenskaya naberezhnaya, 54, kv. 8; Serafima Solomonovna Liberman, ulitsa Arbat, 51, kv. 78; Leonid Nikonovich Gerchikov, Kooperativnaya ulitsa, 2, korpus 13, kv. 54; Vera Alexeevna Volskova, ulitsa Matveevskaya, 10, korpus 4, kv. 286; Antonida Vasilievna Zaitseva, Belovezhskaya ulitsa, 17, kv. 24, all of Moscow, U.S.S.R.; Onisim Julievich Magidson, deceased, late of Moscow, U.S.S.R.; by Galina Konstantinovna Magidson, and by July Onisimovich Magidson, administrators, both of Mytnaya ulitsa, 28, kv. 46, Moscow, U.S.S.R.

Continuation of Ser. No. 655,020, Feb. 4, 1976, abandoned, which is a continuation of Ser. No. 415,841, Nov. 14, 1973, abandoned. This application Dec. 2, 1976, Ser. No. 746,688
Int. Cl.² C07D *471/14*
U.S. Cl. 544—343 2 Claims

1. A compound of the formula



(I)

where R is selected from the group, consisting of hydrogen, methoxy or lower alkyl, R′ is lower alkyl, *m* is 2 and *n* is 2.

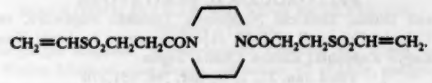
4,088,648

BIS 1,4-(B-VINYLSO$_2$-PROPIONYL)-PIPERAZINE

Norman Alfred Smith, Hornchurch, England, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed Oct. 22, 1976, Ser. No. 734,782
Claims priority, application United Kingdom, Oct. 31, 1975, 45279/75
Int. Cl.² C07D *295/18*
U.S. Cl. 544—387 1 Claim

1. A vinylsulphone compound of the formula



4,088,649

PROCESS FOR PREPARING A DIKETO-PIPERAZINE

Alistair Y. Smith, Geneva; Paul Dietrich, Chene-Bourg, and Wilhelm Pickenhagen, Onex, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

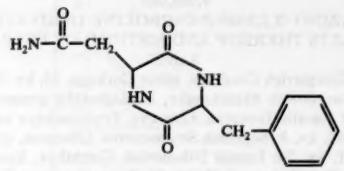
Division of Ser. No. 700,168, Jun. 28, 1976, Pat. No. 4,038,429. This application Apr. 5, 1977, Ser. No. 784,832

Claims priority, application Switzerland, Jul. 2, 1975, 8589/75; Oct. 10, 1975, 13499/75

Int. Cl.[2] C07D *241/38*

U.S. Cl. 544—385 3 Claims

1. A process for the preparation of a diketopiperazine of the formula



which comprises (a) cyclizing aspartame by means of an acidic cyclizing agent selected from the group consisting of mineral and organic protonic acids, cationic acidic resins and acidic diatomaceous earth, in a suspension or solution in a lower aliphatic alcohol at a temperature of from about 100° to 150° C. and at a pressure higher than atmospheric pressure, and (b) subsequently treating the resulting reaction mixture with ammonia at a temperature of from about 80° to 120° C. and at a pressure higher than atmospheric pressure.

4,088,650

NEW DYES OF THE NAPHTOYLENEBENZIMIDAZOLE SERIES

Alain Yves Le Pape, Rouen, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

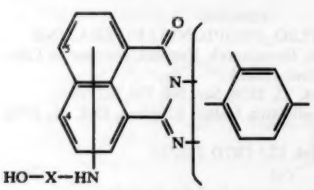
Filed Oct. 7, 1976, Ser. No. 730,755

Claims priority, application France, Oct. 23, 1975, 75 32447

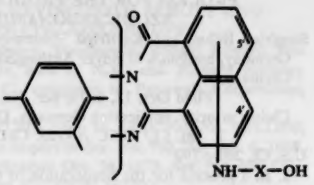
Int. Cl.[2] C07D *471/06;* D06P *1/382*

U.S. Cl. 260—282 2 Claims

1. A dyestuff having the formula



-continued



in which X represents a straight or branched aliphatic chain having 1 to 4 carbon atoms, wherein the NH—X—OH residues are fixed in the 4,4′ or 4,5′ or 5,5′ positions.

4,088,651

ACYLAMINO QUINOPHTHALONE COMPOUNDS

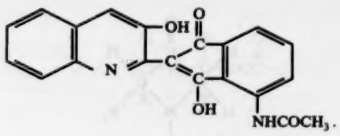
Dietmar Kalz, Leverkusen, and Gerhard Wolfrum, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 782,731, Dec. 10, 1968, abandoned. This application Apr. 17, 1975, Ser. No. 568,858

Int. Cl.[2] C09B *25/00*

U.S. Cl. 260—287 H 2 Claims

1. The compound having the formula



4,088,652

ACYLAZABICYCLOHEXANES

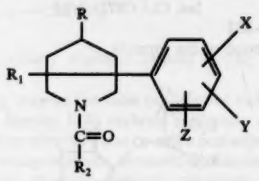
William Joseph Fanshawe, Pearl River; Joseph William Epstein, Monroe; Lantz Stephen Crawley, Spring Valley, all of N.Y.; Corris Mabelle Hofmann, Ho-Ho-Kus, and Sidney Robert Safir, River Edge, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 600,559, Jul. 31, 1975, abandoned. This application Dec. 10, 1976, Ser. No. 749,578

Int. Cl.[2] C07D *221/22*

U.S. Cl. 260—293.54 9 Claims

1. A compound of the formula:



wherein X and Z are selected from the group consisting of hydrogen, halogen and C_1–C_6 alkoxy; Y is selected from the group consisting of hydrogen, halogen, C_1–C_6 alkyl, C_1–C_6 alkoxy, trifluoromethyl, nitro, amino, acetamido and hydroxy; R and R_1 are selected from the group consisting of hydrogen and C_1–C_6 alkyl and R_2 is selected from the group consisting of hydrogen, C_1–C_6 alkyl, C_3–C_6 cycloalkyl, phenyl, halophenyl, furyl, adamantyl, naphthyl and norbornyl.

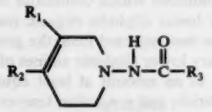
4,088,653

TETRAHYDROPYRIDYL DERIVATIVES

Edward E. Knaus; Kinfe Redda, both of Edmonton, and Frank Wilhelm Wandelmaier, Montreal, all of Canada, assignors to Canadian Patents and Developments Limited, Ottawa, Canada

Filed Aug. 23, 1976, Ser. No. 716,676
Int. Cl.[2] C07D *401/12*; A61K *31/44*
U.S. Cl. 260—295 AM 19 Claims

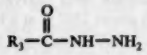
1. A tetrahydropyridine of the formula:



(I)

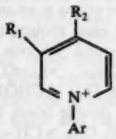
or a non-toxic pharmaceutically acceptably salt thereof, wherein R_1 and R_2 are selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, and hydroxy lower alkyl, and if R_1 or R_2 is other than hydrogen, the other substituent is hydrogen; and R_3 is a member selected from the group consisting of pyridyl, phenyl, and lower alkyl substituted or lower alkoxy substituted pyridyl or phenyl.

15. A method of preparing a tetrahydropyridine derivative of structural formula 1 as defined in claim 1 which comprises reacting in a methanol solvent at room temperature a carbonylhydrazide of the formula:



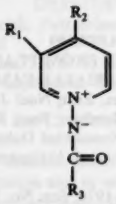
(II)

wherein R_3 is as defined in claim 1, with an arylpyridinium halide of structural formula:



(III)

wherein R_1 and R_2 are as defined in claim 1, Ar represents an aryl or substituted aryl group, and X is Cl, Br, or I, heating the product at reflux temperatures in dioxane/water sufficiently to convert to N-(pyridylcarbonylimino) ylide of the formula:



(IV)

wherein R_1, R_2 and R_3 are as defined above, and converting the pyridinium ylide of formula IV at a temperature of 0° C in an ethanol solvent in the presence of a borohydride reducing agent to a substituted carbonylimine of the formula I.

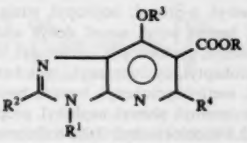
4,088,654

DERIVATIVES OF IMIDAZO(4,5-b)PYRIDINES

Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 736,986, Oct. 29, 1976, Pat. No. 4,048,182, which is a division of Ser. No. 665,754, Mar. 11, 1976, Pat. No. 4,003,908. This application May 9, 1977, Ser. No. 794,877
Int. Cl.[2] C07D *471/04*
U.S. Cl. 260—295.5 B 8 Claims

1. A compound of the formula



wherein R is hydrogen or lower alkyl; R^1 is hydrogen, lower alkyl, phenyl, phenyl-lower alkyl or cyclo-lower alkyl; R^2 is hydrogen, lower alkyl, phenyl or phenyl-lower alkyl; R^3 is phenyl, substituted phenyl wherein the phenyl ring bears one or two substituents of the group lower alkyl, halogen, trifluoromethyl or amino, or phenyl-lower alkyl ; R^4 is hydrogen, lower alkyl or phenyl;
and physiologically acceptable salts thereof.

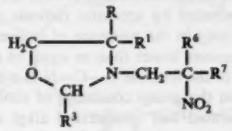
4,088,655

N-SUBSTITUTED NITROALKYL OXAZALIDINE

Jerry H. Hunsucker, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed May 13, 1974, Ser. No. 469,200
Int. Cl.[2] C07D *263/04*, *263/06*
U.S. Cl. 260—307 FA 4 Claims

1. A compound represented by the formula



wherein R and R^1 are hydrogen or alkyl of 1 or 2 carbon atoms and can be the same or different; R^3 is hydrogen, alkyl of from 1 to 3 carbon atoms or hydroxyphenyl; where R^6 is hydrogen, methyl, or ethyl and R^7 is methyl, hydroxymethyl, or ethyl.

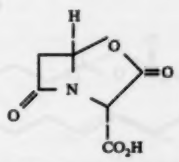
4,088,656

OXOCLAVAMS

Thomas Trefor Howarth, Cranleigh, and Irene Stirling, Worcester Park, both of England, assignors to Beecham Group Limited, Great Britain

Filed Nov. 26, 1976, Ser. No. 745,103
Claims priority, application United Kingdom, Dec. 15, 1975, 51241/75
Int. Cl.[2] C07D *498/04*
U.S. Cl. 260—307 FA 12 Claims

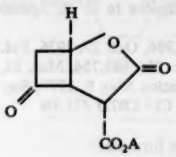
1. The compound of the formula (II):



(II)

or a pharmaceutically acceptable salt thereof.

8. An ester of the formula (III):



(III)

wherein A is methyl, ethyl, n-propyl, isopropyl, straight or branched butyl, pentyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, vinyl, allyl, butenyl, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclohexenyl, cyclohexadienyl, methylcyclopentyl, methylcyclohexyl, benzyl, benzhydryl, phenylethyl, naphthylmethyl, phenyl, naphthyl, propynyl, tolyl, 2-chloroethyl, 2,2,2-trichloroethyl, 2,2,2-trifluoroethyl, acetylmethyl, benzoylmethyl, 2-methoxyethyl, p-chlorobenzyl, p-methoxybenzyl, p-nitrobenzyl, p-bromobenzyl, m-chlorobenzyl, 6-methoxynaphthyl-2-methyl, p-chlorophenyl or p-methoxyphenyl.

4,088,657

PROCESS FOR MANUFACTURING N-ACYL DERIVATIVES OF GLYCINES α-SUBSTITUTED BY RADICALS OF AROMATIC NATURE AND NOVEL PRODUCTS THEREOF

Yani Christidis, Paris, and Alain Schouteeten, Villiers Le Bel, both of France, assignors to Nobel Hoechst Chimie, Puteaux, France

Filed Sep. 10, 1976, Ser. No. 722,286
Claims priority, application France, Sep. 12, 1975, 75 28152
Int. Cl.[2] C07D *333/24;* C07C *101/42*
U.S. Cl. 260—332.2 A **6 Claims**

1. The process of manufacturing N-acyl derivatives of glycines alpha-substituted by aromatic radicals, comprising the steps of (a) reacting in the presence of concentrated sulfuric acid, at a temperature lower than or equal to about 30° C, an aliphatic nitrile of the formula R—C≡N in which R is a radical selected from the group consisting of substituted and unsubstituted, saturated and unsaturated alkyl radicals with a concentrated aqueous solution of glyoxylic acid; (b) condensing the mixture obtained from (a) at a temperature lower than or equal to about 35° C, with a substituted or unsubstituted aromatic hydrocarbon or thiophene derivative not having an hydroxyl group in its formula and having at least one substitutable free hydrogen and (c) collecting the resulting product.

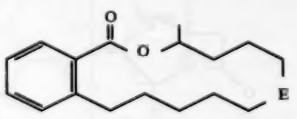
4,088,658

SYNTHESIS OF DIDEOXYZEARALANE AND RELATED COMPOUNDS

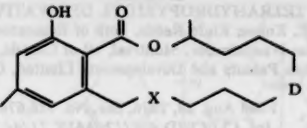
Donald Edwin Robertson, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Nov. 4, 1976, Ser. No. 738,929
Int. Cl.[2] C07D *313/00*
U.S. Cl. 260—343.41 **6 Claims**

1. A method for preparing a deoxyzearalane type compound of the formula



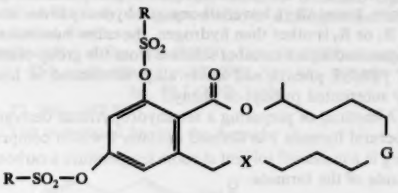
comprising reacting a hydroxy compound of the formula



with an organic sulfonyl chloride of the formula

RSO_2Cl

under esterifying conditions which conditions include a non-reactive, aromatic or lower aliphatic organic reaction solvent containing an organic base selected from the group consisting of pyridine and tertiary lower aliphatic amines of from about 6 to 10 carbon atoms in an amount at least equimolar to the organic sulfonyl chloride; and a reaction temperature of from about 0° to about 75° C, to form a sulfonate ester derivative of the formula



recovering the sulfonate ester derivative; and catalytically hydrogenolyzing the sulfonate ester derivative at a temperature of from about 100° to about 250° C at a hydrogen pressure of from about 200 to about 1000 pounds per square inch (about 14.1 to about 70.4 kilograms per square centimeter), in the presence of a catalyst selected from the group consisting of platinum, palladium, and Raney nickel, in a non-reactive, aromatic or lower aliphatic organic solvent containing a proton acceptor selected from the group consisting of pyridine, any isomeric form of lutidine, and tertiary lower aliphatic amines of from about 6 to 10 carbon atoms in an amount at least equivalent to the alkyl sulfonate ester groups, thereby forming the deoxyzearalane type compound; wherein D is selected from the group consisting of $—CH_2—$, >C=O, and >CHOH; E is the same as D except when D is >CHOH, E is $—CH_2—$; X may be a single bond or a double bond; G is the same as D, except when D is >CHOH, G is $>CH—O—SO_2R$; and R is selected from the group consisting of lower alkyl of from 1 to about 5 carbon atoms.

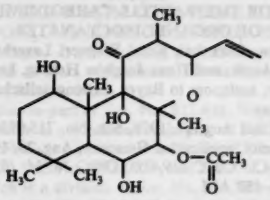
4,088,659

EFFECTIVE SUBSTANCE FROM PLANTS BELONGING TO THE LABIATAE FAMILY

Sujata Vasudev Bhat, Thana, East; Noel John de Souza, Bombay; Horst Dornauer, Bombay; Bani Kanta Bhattacharya, Bombay, and Alihusein Nomanbhai Dohadwalla, Bombay, all of India, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 17, 1976, Ser. No. 751,967
Claims priority, application Germany, Dec. 22, 1975, 2557784
Int. Cl.[2] C07D *311/02;* A61K *35/78, 31/35*
U.S. Cl. 260—345.2 **1 Claim**

1. A compound, in purified and isolated form, of the formula



4,088,660

METHOD FOR THE SEPARATION AND RECOVERY OF FURFURAL AND ORGANIC VOLATILE ACIDS, SUCH AS ACETIC ACID AND FORMIC ACID, FROM THE PROCESS OF PREPARATION OF FURFURAL

Juhani Puurunen, 28660 Pietniemi, Pori 66, Finland

Filed Dec. 17, 1976, Ser. No. 751,589
Claims priority, application Finland, Jan. 7, 1976, 760026
Int. Cl.² C07D *307/50*
U.S. Cl. 260—347.9 14 Claims

1. A method for the separation and recovery of furfural and volatile organic acids from a vapor mixture containing water, methanol, furfural and volatile organic acids, the vapor mixture being obtained from the acid hydrolysis in the presence of water at elevated temperature and pressure of a vegetative source of pentosan, which comprises:

(a) contacting the vapor mixture containing water, methanol, furfural and volatile organic acids with a concentrated solution of furfural, to absorb substantially all of the volatile organic acids and part of the water into the furfural solution and provide a vapor mixture containing the remaining water, methanol and furfural,

(b) dehydrating the concentrated solution of furfural containing absorbed volatile organic acids and water to remove substantially all of the latter and provide a concentrated solution of furfural and volatile organic acid;

(c) separating the volatile organic acids from the furfural;

(d) condensing the vapor mixture resulting from step (a) which contains water, methanol and furfural to provide a dilute aqueous solution of methanol and furfural; and

(e) separating the water and methanol from the furfural in the dilute aqueous solution resulting from step (d).

4,088,661

CATIONIC 1,4-DIAMINO-ANTHRAQUINONE DYESTUFFS

Emilio Baserga, Zurich, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Dec. 12, 1975, Ser. No. 640,216
Claims priority, application Switzerland, Dec. 20, 1974, 17019/74
Int. Cl.² C09B *1/28*
U.S. Cl. 260—378 12 Claims

1. A cationic 1,4-diamino anthraquinone dyestuff which is free from sulpho groups and in which the 4-amino group is substituted by a xylyl radical and the 1-amino group is substituted via a propylene bridge by a radical of the formula $-N^{\oplus}R_1R_2R_3$ in which

R_1 and R_2, independently, are C_{1-4}alkyl and

R_3 is hydrogen, C_{1-4}alkyl, 2-hydroxypropyl or ethyl, allyl, benzyl or 2-aminocarbonyl-ethyl.

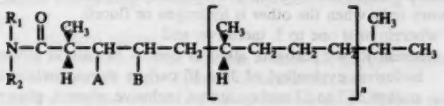
4,088,662

OPTICALLY ACTIVE AMIDES AND PROCESS FOR PRODUCING THE SAME

Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 587,570, Jun. 17, 1975, Pat. No. 4,016,178.
This application Dec. 8, 1976, Ser. No. 746,987
Int. Cl.² C09F *5/00*; C11C *3/00*
U.S. Cl. 260—404 6 Claims

1. The compound of the formula



wherein *n* is an integer of from 0 to 1; A and B are hydrogen or taken together form a carbon to carbon bond; and R_1 and R_2 are lower alkyl.

2. The compound 2(R,S)-6-dimethyl-3(E)-heptenoic acid dimethylamide.

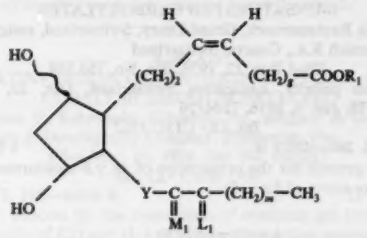
4,088,663

CIS-4,5-DIDEHYDRO-CIS-13-PGF$_1$ COMPOUNDS

Ernest W. Yankee, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 595,869, Jul. 14, 1975, Pat. No. 4,026,909.
This application Mar. 3, 1977, Ser. No. 774,077
Int. Cl.² C07C *177/00*
U.S. Cl. 260—408 25 Claims

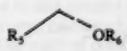
1. A compound of the formula



wherein *g* is two, three, or 4;

wherein Y is cis-CH=CH-;

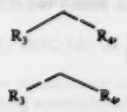
wherein M_1 is



or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein *m* is one to 5, inclusive; and

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,088,664

PROCESS FOR THE PREPARATION OF ALKYL γ, δ-UNSATURATED CARBOXYLATES

Valentin Rautenstrauch, Grand-Lancy, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

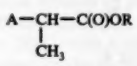
Filed Dec. 22, 1976, Ser. No. 753,524

Claims priority, application Switzerland, Dec. 23, 1975, 16675/75; Jun. 4, 1976, 7104/76

Int. Cl.[2] C11C *3/02*

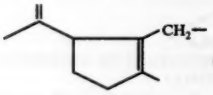
U.S. Cl. 260—410.9 R **4 Claims**

1. A process for the preparation of an γ,δ-unsaturated carboxylate esters of formula

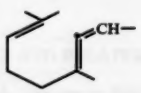


(Ia)

wherein symbol A represents a univalent radical of formula

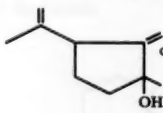


or of formula



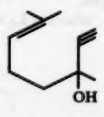
and symbol R represents a lower alkyl radical comprising 1 to 6 carbon atoms, which comprises:

reacting an α,β-unsaturated alcohol of formula



(II)

or, respectively of formula



(III)

with a trialkyl ortho-propionate in the presence of an organic acid having a pk_a of about 7 to 9.

4,088,665

PROCESS FOR THE PARTIAL CARBODIIMIDIZATION OF ORGANIC ISOCYANATES

Kurt Findeisen, Odenthal; Kuno Wagner, Leverkusen; Walter Schäfer, Cologne, and Hans Joachim Hennig, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 17, 1976, Ser. No. 715,092

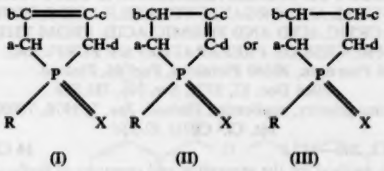
Claims priority, application Germany, Aug. 23, 1975, 2537685

Int. Cl.[2] C07C *119/055;* C08G *18/14, 18/78*

U.S. Cl. 260—453 AM **6 Claims**

1. A process for the partial carbodiimidization of mono-, di-, and/or polyisocyanates, comprising:

(a) mixing organic mono-, di-, and/or polyisocyanates with 0.1 to 100 ppm of a phosphorus compound of the general formula:

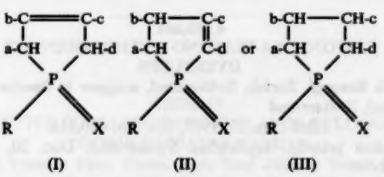


(I) (II) (III)

wherein R represents a lower alkyl radical, a phenyl radical, an alkoxy radical, a hydrogen atom or an alkenyl radical; *a, b, c* and *d* each represent hydrogen, a halogen atom, a lower alkyl, lower alkenyl, phenyl, a cyclohexyl or a polymethylene group which together with two neighboring C-atoms of the heterocyclic ring forms a cycloaliphatic ring; and X represents an oxygen or sulphur atom; at a temperature from about 0° to about 200° C, and,

(b) terminating the carbodiimidization reaction after the evolution of 1 to 90% of the quantity of carbon dioxide to be theoretically expected in the carbodiimidization of all isocyanate groups present, by the addition of a quantity at least equivalent to the phosphorus compound used of a carbamic acid chloride or carbamic acid bromide which deactivates the catalyst while forming an adduct therewith.

6. In an isocyanate polyaddition process, wherein an organic isocyanate is reacted with an active hydrogen containing material, the improvement wherein the isocyanate is an isocyanate mixture having carbodiimide groups, characterized by a content of 0.1 to 100 ppm of phosphorus compounds of the formula



(I) (II) (III)

in deactivated form in respect of their catalyst effect by adduct formation with a carbamic acid chloride or a carbamic acid bromide wherein R represents a lower alkyl radical, phenyl radical, an alkoxy radical, a hydrogen atom or an alkenyl radical; *a, b, c* and *d* each represent hydrogen, a halogen atom, a lower alkyl, lower alkenyl, phenyl, a cyclohexyl or a polymethylene group which together with two neighboring C-atoms of the heterocyclic ring forms a cycloaliphatic ring; and X represents an oxygen or sulphur atom.

4,088,666

REDUCTIONS WITH CHELATED LITHIUM HYDRIDOALUMINATES OR HYDRIDOBORATES

Arthur W. Langer, Jr., Watchung, and Thomas A. Whitney, Roselle, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 527,648, Nov. 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 504,152, Sep. 9, 1974, which is a continuation-in-part of Ser. No. 344,230, Mar. 23, 1973, Pat. No. 3,933,879, and Ser. No. 462,328, Apr. 19, 1974, which is a division of Ser. No. 276,784, Jul. 31, 1972, abandoned, said Ser. No. 344,230, is a continuation-in-part of Ser. No. 808,328, Mar. 19, 1969, Pat. No. 3,734,936. This application May 17, 1977, Ser. No. 797,766

Int. Cl.[2] C07F *15/02*

U.S. Cl. 260—439 R 25 Claims

1. A process for reducing unsaturated substrates which comprises the step of reacting a reducible substrate with a chelate compound, said chelate compound formed by mixing a lithium hydrido compound and a chelating polyfunctional hydrocarbyl Lewis base in an inert hydrocarbon medium at −100° to +200° C.

4,088,667

LOWER ALKYL 2-TRI-(LOWER)ALKYLSILYLACETYLENE-N-CARBETHOXYGLYCINATES AND PROCESS FOR USING SAME

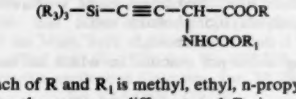
Patrick J. Casara, Strasbourg; Michel Jung, Illkirch Graffenstaden, and Brian Walter Metcalf, Strasbourg, all of France, assignors to Merrell Toraude et Compagnie, Strasbourg, France

Filed Jul. 1, 1977, Ser. No. 812,065

Int. Cl.[2] C07F *7/10*

U.S. Cl. 260—448.2 N 3 Claims

1. A compound of the Formula



wherein each of R and R_1 is methyl, ethyl, n-propyl or n-butyl and may be the same or different and R_3 is methyl, ethyl, n-propyl or n-butyl and each R_3 is the same or two R_3 groups are methyl and the other R_3 group is tert-butyl.

4,088,668

ACETYLENE DERIVATIVES

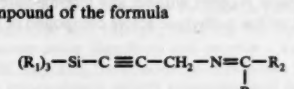
Brian Walter Metcalf, Strasbourg, and Michel Jung, Illkirch Graffenstaden, both of France, assignors to Merrell Toraude et Compagnie, Strasbourg, France

Filed Jul. 1, 1977, Ser. No. 812,068

Int. Cl.[2] C07F *7/10*

U.S. Cl. 260—448.2 N 5 Claims

1. A compound of the formula



wherein R_1 is a straight or branched lower alkyl group having from 1 to 4 carbon atoms; R_2 is trialkylmethyl wherein the alkyl moiety has 1 or 2 carbon atoms, phenyl, 1-adamantanyl or 2-furyl; and R_3 is methoxy or ethoxy and acid addition salts thereof.

4,088,669

METHOD FOR PREPARING ORGANOSILICON COMPOUNDS FROM ELEMENTAL SILICON AND HYDROCARBON ETHERS

James R. Malek; John L. Speier, and Antony P. Wright, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 8, 1977, Ser. No. 785,882

Int. Cl.[2] C07F *7/18*

U.S. Cl. 260—448.8 R 29 Claims

1. A method for preparing organosilicon compounds, said method comprising contacting components consisting essentially of

(a) activated silicon

(b) a hydrocarbon ether wherein at least one oxygen-bonded carbon atom is an aliphatic carbon atom, and

(c) a catalytic amount of a halogen-containing catalyst, said contacting being done in a closed container at a temperature of at least approximately 200° C., thereby producing at least one organosilicon compound bearing at least one silicon-bonded hydrocarbon radical and at least one silicon-bonded hydrocarbonoxy radical.

4,088,670

ETHYLENIC SILICON COMPOUNDS AND THERMOPLASTIC ELASTOMERS OBTAINED THEREFROM

Michel Bargain, Lyon, and Marcel Lefort, Caluire, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Sep. 29, 1975, Ser. No. 617,513

Claims priority, application France, Oct. 1, 1974, 74 33041; Feb. 11, 1975, 75 04191; Feb. 11, 1975, 75 04192

Int. Cl.[2] C07F *7/08*

U.S. Cl. 260—448.2 Q 3 Claims

1. p-(Dimethylvinylsilylmethoxy)-benzoyl chloride.

4,088,671

CONVERSION OF SYNTHESIS GAS USING A COBALT-RUTHENIUM CATALYST

Thaddeus P. Kobylinski, Gibsonia, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Mar. 19, 1976, Ser. No. 668,517

Int. Cl.[2] C07C *1/04*

U.S. Cl. 260—449.6 R 12 Claims

1. A process for the conversion of synthesis gas consisting essentially of CO and H_2 to a product consisting essentially of hydrocarbons and having only minor amounts of methane which comprises contacting said synthesis gas at a temperature of from 60° to 450° C. and a pressure from atmospheric to 300 psig with a catalyst consisting essentially of a major amount of cobalt and a minor amount of ruthenium as the active catalytic components and where in said catalyst the amount of cobalt is from 1 to 50 weight percent, calculated as the metal, and where in said catalyst the molar ratio of cobalt to ruthenium is from 5:1 to about 200:1 and thereafter recovering a product having less than 25 percent methane.

4,088,672

PREPARATION OF DICYANOBUTENES FROM 3-PENTENENITRILE

Dhafir Yusuf Waddan, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 387,724, abandoned. This application Apr. 25, 1975, Ser. No. 571,560

Claims priority, application United Kingdom, Aug. 18, 1972, 38624/72

Int. Cl.[2] C07C *120/00, 121/20*

U.S. Cl. 260—465.8 R 8 Claims

1. A process for the manufacture of dicyanobutenes from 3-pentenenitrile consisting essentially of heating an olefinically unsaturated feed consisting essentially of 3-pentenenitrile at 20° to 450° C with an olefin disproportionation catalyst selected

from the group consisting of an oxide or carbonyl of tungsten, molybdenum, rhenium, rhodium, iridium, osmium, ruthenium, niobium, tantalum, tellurium, lanthanum, thorium, vanadium, or tin, tungsten hexachloride or mixtures thereof.

4,088,673

PROCESS FOR THE PREPARATION OF STYRYL DYESTUFFS

Walter Gomm, Cologne, and Hermann Beecken, Schildgen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

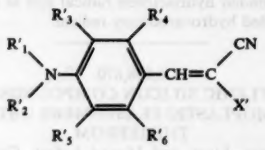
Continuation of Ser. No. 444,835, Feb. 22, 1974, abandoned. This application Nov. 18, 1975, Ser. No. 633,040

Claims priority, application Germany, Feb. 22, 1973, 2308706

Int. Cl.[2] **C07C** *121/78;* **C07D** *215/16, 277/80*

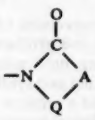
U.S. Cl. 260—465 E **6 Claims**

1. Process for the preparation of a styryl dyestuff free of ionogenic groups of the formula



wherein

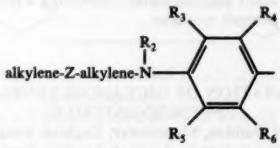
R'_1 is a straight-chain, branched, cyclic, saturated or unsaturated C_1–C_6-alkyl radical which is unsubstituted or which is substituted with a member selected from the group consisting of phenyl, substituted phenyl, C_1–C_5-alkoxy; C_1–C_5-alkylmercapto, phenyloxy, substituted phenyloxy, phenylmercapto, substituted phenylmercapto, heterylmercapto, (C_1–C_5-alkyl)-carbonyl-oxy, phenylcarbonyloxy, substituted phenylcarboxyloxy, (C_1–C_5)-alkoxy-carbonyloxy, (C_1–C_5-alkylamino)-carbonyloxy, phenylaminocarbonyloxy, substituted phenylaminocarbonyloxy, (C_1–C_5-alkoxy)-carbonyl, C_1–C_5-alkyl sulphonyl, phenyl sulphonyl, substituted phenylsulphonyl, halogen, —CN, or



in which

Q is CO, SO_2 or CH_2;

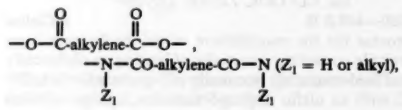
A is ortho-arylene or C_2–C_3-alkylene; or R'_1 is



in which

Z is a direct bond,

O, S, SO, SO_2, NR, —O—CO—O—,



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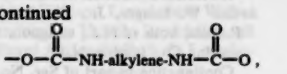


—O—arylene—O—, —CO—O—alkylene—O—CO— or —OCONH-arylene-NHCOO—; phenyl or substituted phenyl;

R'_2 is hydrogen or R'_1;

R'_3–R'_6 are hydrogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, nitro, bromine or chlorine; or

R'_1 together with R'_3 or R'_5 conjointly form the remaining members of a non-aromatic 5-membered or 6-membered ring system which optionally contains oxygen or sulphur;

said heteryl is selected from the group consisting of furane, thiophene, pyridine, pyrimidine, benzoxazole, benzthiazole, benzimidazole and the foregoing heterocyclic radicals substituted with C_1–C_3-alkyl, C_1–C_3-alkoxy, halogen, nitrile, C_2–C_5-carbalkoxy or phenyl,

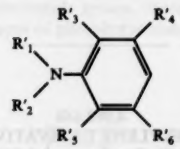
said alkylene radicals are C_1–C_6-alkylene; and said arylene radicals are phenylene or phenylene substituted by C_1–C_3-alkyl, C_1–C_3-alkoxy, C_2–C_5-alkoxycarbonyl, halogen, nitro, —CN or phenoxy; said substituted phenyl is substituted with C_1–C_3-alkyl, C_1–C_3-alkoxy, C_2–C_5-alkoxycarbonyl, halogen, nitro, nitrile or phenoxy;

X' is CN, (C_1–C_4-alkyl)-carbonyl, substituted (C_1–C_4-alkyl)-carbonyl, (C_1–C_4-alkoxy)-carbonyl, substituted (C_1–C_4-alkoxy)-carbonyl, heterylcarbonyl, phenoxycarbonyl, substituted phenoxycarbonyl, C_1–C_4-alkyl-sulphonyl, substituted C_1–C_4-alkylsulphonyl, carbamoyl, phenyl-(C_1–C_4-alkoxy)-carbonyl, N-(C_1–C_4-alkyl)-carbamoyl, substituted N-(C_1–C_4-alkyl)-carbamoyl, N,N-di(C_1–C_4-alkyl)-carbamoyl, or substituted N,N-di(C_1–C_4-alkyl)-carbamoyl;

wherein in X' said substituted alkyl and alkoxy radicals are substituted by OH, F, Cl, Br, CN, C_1–C_3-alkoxy or C_2–C_4-alkylcarbonyloxy, and said substituted phenyl or phenoxy radicals are substituted by Cl, F, Br, C_1–C_4-alkoxy, NO_2, CN, C_1–C_4-alkyl, or phenoxy, and

"heteryl" is defined as above;

comprising a one-pot reaction in which an amine of the formula



is treated with at least 1 equivalent of a Vilsmeier reagent;

unconverted Vilsmeier reagent is decomposed by the addition of aliphatic alcohol;

the pH value is adjusted to above 4 by addition of base; and

the reaction product without any intermediate isolation is reacted with a methylene-active compound of the formula

4,088,674

NOVEL ESTER ISOCYANATES

William D. Emmons, Huntingdon Valley, and Jerome F. Levy, Bethayres, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 841,128, is a division of Ser. No. 519,001, Jan. 6, 1966, Pat. No. 3,468,934. This application May 12, 1972, Ser. No. 254,809

Int. Cl.[2] C07C *119/042, 149/20, 149/40, 163/00*

U.S. Cl. 560—154 2 Claims

1. An ester represented by the general formula:

$$ZR_1OOC—R_2—X—R_3—COOR_4Z$$

wherein X is a chalcogenide selected from the group consisting of oxygen, sulfur and selenium; R_2 and R_3 are divalent (C_1-C_2) alkylene radicals; R_1 and R_4 are alkylene radicals having from two to eight carbon atoms and up to one hetero oxygen or sulfur atom and Z is —NCO.

4,088,675

PRODUCTION OF ACYL PHOSPHATE SALTS

George M. Whitesides, Newton; Patricia E. Garrett, Somerville, both of Mass., and Merrell Siegel, Houston, Tex., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 15, 1976, Ser. No. 666,995

Int. Cl.[2] C07C *51/56, 87/06;* C07F *9/06*

U.S. Cl. 260—501.21 22 Claims

1. A method of preparing an acyl phosphate salt, comprising the steps of reacting a ketene with phosphoric acid, and reacting the resulting product with a basic material selected from the group of ammonia, primary, secondary and tertiary amines, and mixtures thereof, to produce said acyl phosphate salt.

4,088,676

PROCESS FOR THE PREPARATION OF ORGANIC SOLUTIONS OF PERCARBOXYLIC ACIDS

Willi Hofen, Rodenbach; Günter Prescher, Hanau; Gerd Siekmann, and Günter Wolf, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen and Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, both of, Germany

Filed Apr. 28, 1976, Ser. No. 678,825

Claims priority, application Germany, Apr. 30, 1975, 2519293

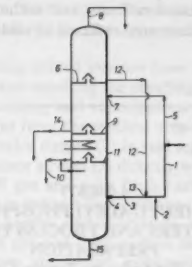
Int. Cl.[2] C07C *179/10*

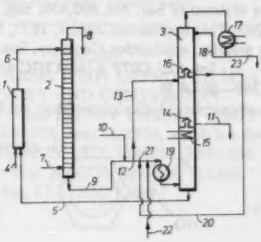
U.S. Cl. 260—502 R 20 Claims

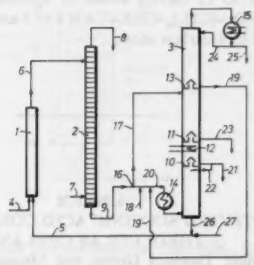
1. In the process for continuous production of a solution of an aliphatic percarboxylic acid in an organic solvent which is immiscible with water by contacting aqueous hydrogen peroxide with the carboxylic acid corresponding to said percarboxylic acid, said carboxylic acid having 1 to 4 carbon atoms, in the presence of a water soluble acid catalyst selected from the group consisting of sulfuric acid, phosphoric acid, a phosphonic acid, a phosphinic acid, an acid salt of sulfuric acid, an acid salt of phosphoric acid, a sulfonic acid, a chlorinated sulfonic acid, a fluorinated sulfonic acid and a mixture thereof for the reaction to produce the percarboxylic acid and water in a reaction mixture comprising the percarboxylic acid, water, catalyst and unreacted hydrogen peroxide, extracting the reaction mixture with said organic solvent for take-up of the percarboxylic acid by the organic solvent to provide said solution of percarboxylic acid, and provide an aqueous raffinate rich in hydrogen peroxide and catalyst, distilling the aqueous raffinate, to remove water therefrom and provide a concentrated raffinate, and recycling the concentrated raffinate to said contacting, the improvement which comprises said acid catalyst having a boiling point above 160° C and said distillation being performed at a pressure below 250 mm Hg and a sump temperature of less than 85° C, by:

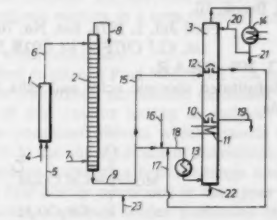
(a) dividing the raffinate produced by the extraction into two streams in a ratio of 1 to 25 : 100 to provide a larger raffinate stream and a smaller raffinate stream,

(b) distilling said streams under reduced pressure in a distillation column which has at least two take-off weirs as tray inserts, the first take-off weir being at least two theoretical plates above the sump, the second take-off weir being arranged at least two theoretical plates above the first take-off weir and the section of column between the second take-off weir and the top of the column having at least two theoretical plates,









(c) the larger raffinate stream being introduced into the column below the first take-off weir and the smaller raffinate stream being introduced into the column below the second take-off weir,

(d) water being removed as overhead product of the distillation,

(e) a first sidestream, which essentially contains the hydrogen peroxide from the smaller raffinate stream being withdrawn from the second take-off weir which is a 2 to 40% by weight aqueous solution of hydrogen peroxide,

(f) a second sidestream being withdrawn from the first take-off weir, which is an aqueous solution of the acid catalyst substantially free of hydrogen peroxide, and

(g) concentrated aqueous solution of hydrogen peroxide and acid catalyst being collected in the sump of the column as said concentrated raffinate and withdrawing and recycling the concentrated raffinate to said contacting.

4,088,677

CARBOXYPHENYL-ALKYLPHOSPHINIC ACIDS, THEIR ESTERS AND PROCESS FOR THEIR PREPARATION

Hans-Jerg Kleiner, Bad Soden am Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

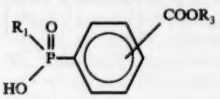
Continuation of Ser. No. 658,882, Feb. 18, 1976, abandoned, which is a division of Ser. No. 505,630, Sep. 13, 1974, Pat. No. 3,974,243. This application Jan. 7, 1977, Ser. No. 757,504

Claims priority, application Germany, Sep. 17, 1973, 2346657

Int. Cl.² C07F 9/30; C07C 69/76

U.S. Cl. 260—502.4 R **5 Claims**

1. A carboxyphenyl-alkylphosphinic acid of the formula



wherein R_1 is alkyl of 1 to 4 carbon atoms, R_3 is hydrogen, alkyl of from 1 to 12 carbon atoms or hydroxyalkyl having the formula HO—$(CH_2)_n$-CHR—, *n* is 1 to 3 and R is hydrogen or alkyl of 1 to 4 carbon atoms.

4,088,678

SUBSTITUTED SUCCINIC ACID COMPOUNDS AND THEIR USE AS CHELANTS

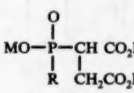
Joseph Matt, Downers Grove, and Manuel Slovinsky, Woodridge, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Jul. 1, 1976, Ser. No. 701,785

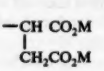
Int. Cl.² C07F 9/30; C02B 5/06

U.S. Cl. 260—502.4 R **1 Claim**

1. Substituted succinic acids and salts thereof having the formula:



where M is H, alkali metal, ammonia or amine and R is:



4,088,679

PROCESS FOR THE PREPARATION OF PERPROPIONIC ACID SOLUTIONS

Günter Prescher, Hanau; Otto Weiberg, Neu-Isenburg; Helmut Waldmann, Leverkusen, and Hermann Seifert, Cologne, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Filed Apr. 28, 1976, Ser. No. 678,820

Claims priority, application Germany, Apr. 30, 1975, 2519300

Int. Cl.² C07C 179/10

U.S. Cl. 260—502 R **7 Claims**

1. In the process of producing perpropionic acid by reaction of hydrogen peroxide and propionic acid in an aqueous medium and in the presence of sulfuric acid catalyst for the reaction, for production of an equilibrium mixture of perpropionic acid, propionic acid, hydrogen peroxide and water, and sulfuric acid catalyst, the improvement which comprises, for reduction of explosion hazard of the reaction mixture: employing a molar ratio of hydrogen peroxide: propionic acid of more than 3.5:1 and up to 10:1, a temperature of 20°–60° C, a weight ratio of hydrogen peroxide:water before the start of the reaction thereof with propionic acid, based on 100% hydrogen peroxide, of up to 0.8, the concentration of the sulfuric acid in the reaction mixture being 10–40% by weight.

4,088,680

LINEAR ALKYL HYDROCARBYLOXYBENZENE DISULFONATES

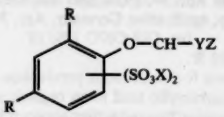
Gar Lok Woo, Tiburon, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 546,665, Feb. 3, 1975, abandoned, which is a continuation-in-part of Ser. No. 256,504, May 24, 1972, abandoned, which is a division of Ser. No. 66,088, Aug. 21, 1970, Pat. No. 3,707,352. This application Oct. 18, 1976, Ser. No. 733,588

Int. Cl.² C07C 143/42; B08B 3/00

U.S. Cl. 260—512 R **2 Claims**

1. Detergent active materials capable of heavy duty washing in the absence of phosphates consisting of linear alkyl hydrocarbyloxybenzene disulfonates of the formula



in which one R is linear alkyl of 16 to 21 carbon atoms and the other is H, X is H or an alkali metal, Y and Z are H.

4,088,681

SUBSTITUTED 1-ALKENYNYL-CYCLOHEXANOLS AND -CYCLOHEXENES AND PROCESSES FOR THEIR PREPARATION

Manfred Baumann, Mannheim, and Werner Hoffmann, Neuhofen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

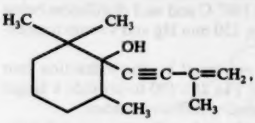
Filed Dec. 9, 1976, Ser. No. 749,006

Claims priority, application Germany, Dec. 27, 1975, 2558807; Dec. 27, 1975, 2558806

Int. Cl.² C07C 35/08; A61K 7/46, 7/06

U.S. Cl. 568—828 **5 Claims**

1. A compound selected from the group consisting of



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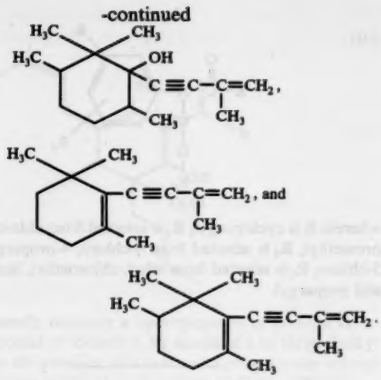


4,088,682

OXALATE HYDROGENATION PROCESS

Robert Kenneth Jordan, 3979 Tuxey Ave., Pittsburgh, Pa. 15227

Filed Jul. 3, 1975, Ser. No. 592,757
Int. Cl.[2] C07C *29/00, 99/00, 51/52*
U.S. Cl. 260—534 R 13 Claims

1. A process for the production of ethylene glycol comprising hydrogenating oxalic acid containing less than 2 moles water per mole of oxalic acid at a temperature in the range of from about 50° to about 500° C.

4,088,683

BIBENZYL-4-SULFONYL CHLORIDE

Fred Max Sonnenberg, Worcester, Mass., assignor to American Hoechst Corporation, Somerville, N.J.

Division of Ser. No. 648,445, Jan. 12, 1976, Pat. No. 4,024,119. This application Dec. 6, 1976, Ser. No. 747,857
Int. Cl.[2] C07C *143/70*
U.S. Cl. 260—543 R 1 Claim

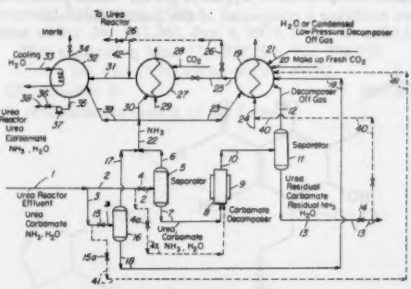
1. Bibenzyl 4-sulfonyl chloride.

4,088,684

UREA REACTOR EFFLUENT SOLUTION RECYCLE IN UREA SYNTHESIS

Ivo Mavrovic, 530 E. 72nd St., New York, N.Y. 10021

Filed Jul. 30, 1976, Ser. No. 710,318
Int. Cl.[2] C07C *126/02*
U.S. Cl. 260—555 A 10 Claims



1. The process for synthesizing urea, which comprises the sequence of steps consisting essentially of

reacting ammonia and carbon dioxide in a reactor at elevated urea synthesis pressure to form an aqueous urea solution (1) containing ammonium carbamate, ammonia and water,

splitting said aqueous solution (1) into a major stream (2) thereof and a minor stream (3) thereof,

reducing the pressures of each of said major stream (2) and minor stream (3) substantially to from about 60 to about 700 pounds per square inch, heating said major stream (2) in an ammonium carbamate decomposer to a temperature above the decomposition temperature of ammonium carbamate to decompose a substantial portion of the ammonium carbamate therein to ammonia and carbon dioxide, and vaporize part of the excess ammonia and part of the water therein;

passing the resulting heated mixture from said decomposer to a separator and expelling the resulting decomposer off gas stream containing said vaporized excess ammonia and part of the water from the residual urea-containing liquid phase of said major stream (2) in said separator, and

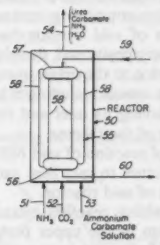
contacting said minor stream (3) directly with said resulting decomposer off gas and with fresh carbon dioxide in a heat exchanger in indirect heat exchange with a relatively colder fluid, whereby carbon dioxide contained in said decomposer off gas and fresh carbon dioxide react with ammonia to form ammonium carbamate and a product containing the same, water, urea and ammonia is obtained, and heat of formation of said ammonium carbamate is transferred to said relatively colder fluid.

4,088,685

UREA SYNTHESIS WITH IMPROVED HEAT RECOVERY AND CONVERSION

Ivo Mavrovic, 530 E. 72nd St., New York, N.Y. 10021

Division of Ser. No. 650,973, Jan. 21, 1976, which is a division of Ser. No. 190,519, Oct. 19, 1971, Pat. No. 3,952,055. This application Sep. 22, 1976, Ser. No. 725,444
Int. Cl.[2] C07C *126/02*
U.S. Cl. 260—555 A 7 Claims



1. In a urea synthesis process wherein fluid NH_3, fluid CO_2 and an aqueous solution comprising ammonium carbamate are contacted at elevated pressure and elevated temperature to form a total urea synthesis mixture in a urea synthesis reactor to form urea,

the improvement which comprises

charging reactor feed streams of fluid NH_3, fluid CO_2 and an aqueous solution comprising ammonium carbamate to a lower portion of said reactor having an indirect heat exchange means positioned therein which extends from the lower portion to the upper portion of the reactor, said heat exchange means including a heat exchange medium and including a first header positioned in the upper portion of the reactor, a second header positioned in the lower portion of the reactor and conduit means in said reactor interconnecting said headers for passing heat exchange medium therebetween,

imparting heat of reaction of said NH_3, CO_2 and ammonium carbamate mixture to said heat exchange medium in said second header at the lower portion of said reactor, and

passing the resulting reaction mixture and said heat ex-

change medium to the upper portion of said reactor, said heat exchange medium being so passed through said conduit means to said first header, whereby heat of said heat exchange medium is transferred to said reaction mixture as it is passed from the lower portion to the upper portion of said reactor.

4,088,686

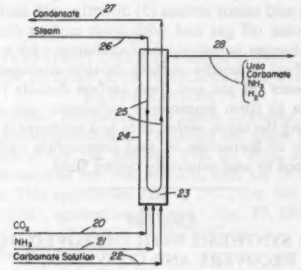
UREA SYNTHESIS WITH IMPROVED HEAT RECOVERY AND CONVERSION

Ivo Mavrovic, 530 E. 72nd St., New York, N.Y. 10021

Division of Ser. No. 650,973, Jan. 21, 1976, which is a division of Ser. No. 190,519, Oct. 19, 1971, Pat. No. 3,952,055. This application Sep. 22, 1976, Ser. No. 725,443

Int. Cl.[2] C07C *126/02*

U.S. Cl. 260—555 A **3 Claims**



1. In a urea synthesis process wherein fluid NH_3, fluid CO_2 and an aqueous solution comprising ammonium carbamate are contacted at elevated pressure and elevated temperature to form a total urea synthesis mixture in a urea synthesis reactor to form urea, the improvement which comprises

charging reactor feed streams of fluid NH_3, fluid CO_2 and an aqueous solution comprising ammonium carbamate to the lower portion of said reactor having an indirect heat exchange means positioned therein which extends from the lower portion to the upper portion of the reactor, said heat exchange means including a heat exchange medium therein and having its inlet and its outlet located at the upper portion of the reactor,

imparting heat of reaction of said NH_3, CO_2 and ammonium carbamate mixture to said heat exchange medium at the lower portion of said reactor,

passing the resulting reaction mixture and said heat exchange medium to the upper portion of said reactor to transfer heat from said heat exchange medium to said reaction mixture, and

passing heated heat exchange medium from said inlet to said lower portion of said reactor thereby transferring heat therefrom to said reaction mixture as said reaction mixture passes upwardly in said reactor, and removing heat exchange medium from said outlet, said heat exchange medium being substantially cooler at said outlet than at said inlet.

4,088,687

HERBICIDAL ACTIVE CARBOXANILIDE DERIVATIVE

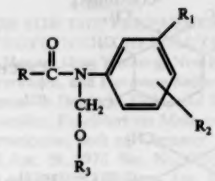
Edmund J. Gaughan, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 539,200, Jan. 6, 1975, which is a continuation-in-part of Ser. No. 449,782, Mar. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 360,242, May 14, 1973, abandoned. This application Feb. 6, 1976, Ser. No. 655,651

Int. Cl.[2] C07C *103/37*

U.S. Cl. 260—557 R **9 Claims**

1. A compound corresponding to the formula:



wherein R is cyclopropyl; R_1 is selected from chloro and trifluoromethyl; R_2 is selected from 4-chloro, 4-propargyloxy, and 5-chloro; R_3 is selected from ethyl, chloroethyl, isobutyl, allyl, and propargyl.

4,088,688

PROCESS FOR MAKING HUMULONES AND NOVEL INTERMEDIATES THEREFOR

Trudi Sigg-Grütter, Winterthur, and Jöst Wild, Porrentruy, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 606,813, Aug. 22, 1975, Pat. No. 4,012,447. This application Feb. 13, 1976, Ser. No. 657,816

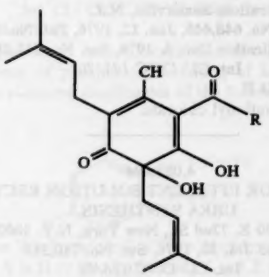
Claims priority, application Switzerland, Sep. 9, 1974, 12156/74; Aug. 1, 1975, 10093/75

Int. Cl.[2] C07C *45/00, 45/16*

U.S. Cl. 260—586 D **10 Claims**

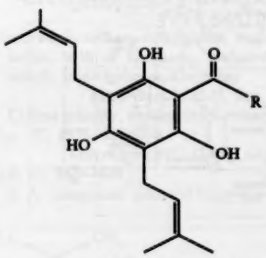
1. A process for the manufacture of compounds of the formula:

(I)



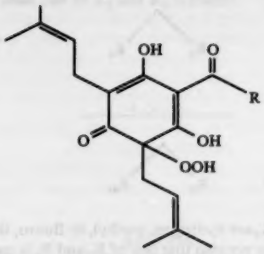
wherein R represents a C_{1-6} alkyl group, which process comprises oxidizing a compound of the general formula:

(II)



by means of elementary oxygen in the presence of a base and a a polar aprotic solvent at a temperature within the range from 0° C. to −50° C., to give a hydroperoxide of the formula

(III)



and subsequently reducing a hydroperoxide of formula III to give a compound of formula I, by means of a tri (lower) alkyl phosphate in the presence of a base and a polar aprotic solvent at a temperature within the range from 0° C. to −50° C.

4,088,689

CYCLOHEXENONE PHOSPHONIUM SALTS

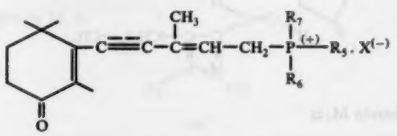
Michael Rosenberger, Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 773,416, Sep. 15, 1976, Pat. No. 4,025,564, which is a division of Ser. No. 585,224, Jun. 9, 1975, Pat. No. 4,000,198. This application Feb. 4, 1977, Ser. No. 765,470

Int. Cl.[2] C07C *45/00*

U.S. Cl. 260—586 R **3 Claims**

1. A compound of the formula:



wherein X is halogen, R_5, R_6 and R_7 are aryl or lower alkyl; and the dotted bond can be optionally hydrogenated.

4,088,690

2-DECARBOXY-2-HYDROXYMETHYL-CIS-4,5-DIDEHYDRO-9-DEOXY-9,10-DIDEHYDRO-PGD$_1$ COMPOUNDS

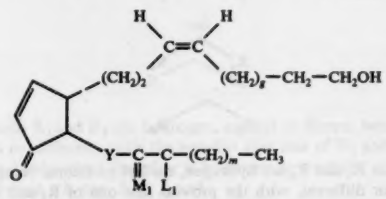
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419. This application Mar. 17, 1977, Ser. No. 778,774

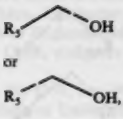
Int. Cl.[2] C07C *49/46, 49/80, 49/82*

U.S. Cl. 260—586 R **22 Claims**

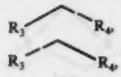
1. A prostaglandin analog of the formula



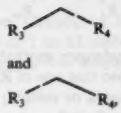
wherein Y is trans—CH=CH—;
wherein M_1 is



wherein R_5 is hydrogen or methyl;
wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive.

4,088,691

2-DECARBOXY-2-HYDROXYMETHYL-CIS-4,5-DIDEHYDRO-11-DEOXY-PGE$_1$ COMPOUNDS

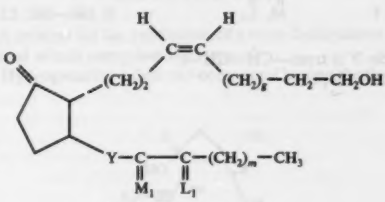
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419. This application Mar. 17, 1977, Ser. No. 778,778

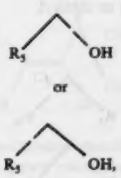
Int. Cl.[2] C07C *49/46, 49/80, 49/82*

U.S. Cl. 260—586 R **22 Claims**

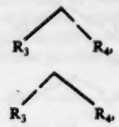
1. A prostaglandin analog of the formula



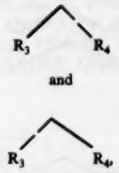
wherein Y is trans—CH=CH—;
wherein M_1 is



wherein R_5 is hydrogen or methyl;
wherein L_1 is



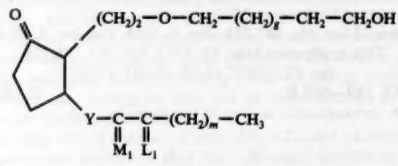
or a mixture of



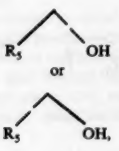
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive.

4,088,692
2-DECARBOXY-2-HYDROXYMETHYL-5-OXA-11-DEOXY-PGE$_1$ COMPOUNDS
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419. This application Mar. 17, 1977, Ser. No. 778,779
Int. Cl.^{2} C07C *49/46, 49/80, 49/82*
U.S. Cl. 260—586 R **22 Claims**

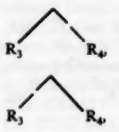
1. A prostaglandin analog of the formula



wherein Y is trans—CH=CH—;
wherein M_1 is

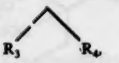


wherein R_5 is hydrogen or methyl;
wherein L_1 is



or a mixture of

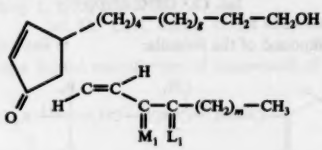
and



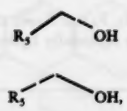
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive.

4,088,693
2-DECARBOXY-2-HYDROXYMETHYL-9-DEOXY-9,10-DIDEHYDRO-PGD$_1$ ANALOGS
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Division of Ser. No. 647,369, Jan. 8, 1976, Pat. No. 4,032,576. This application Apr. 6, 1977, Ser. No. 786,151
Int. Cl.^{2} C07C *49/46, 49/80, 49/82*
U.S. Cl. 260—586 R **15 Claims**

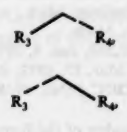
1. A prostaglandin analog of the formula



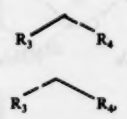
wherein M_1 is



wherein R_5 is hydrogen or methyl;
wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive;

with the proviso that at least one of R_3, R_4, and R_5 is methyl or at least one of R_3 and R_4 is fluoro.

4,088,694

2-DECARBOXY-2-HYDROXYMETHYL-11-DEOXY-PGE$_2$ ANALOGS

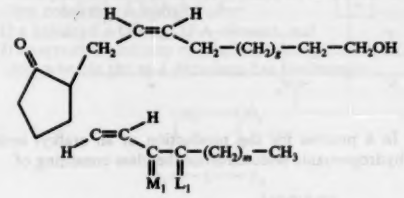
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,369, Jan. 8, 1976, Pat. No. 4,032,576. This application Apr. 6, 1977, Ser. No. 786,152

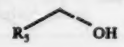
Int. Cl.^{2} C07C *49/46, 49/80, 49/82*

U.S. Cl. 260—586 R **15 Claims**

1. A prostaglandin analog of the formula



wherein M_1 is



or

wherein R_5 is hydrogen or methyl;
wherein L_1 is

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive;
with the proviso that at least one of R_3, R_4, and R_5 is methyl or at least one of R_3 and R_4 is fluoro.

4,088,695

CYCLOPENTANONE DERIVATIVES

Michael Peter Lear Caton, Upminster; Edward Charles John Coffee, London, both of England, and Gordon Leonard Watkins, Santa Monica, Calif., assignors to May & Baker Limited, Essex, England

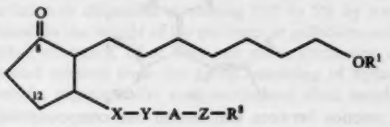
Filed Jan. 23, 1975, Ser. No. 543,552

Claims priority, application United Kingdom, Jan. 26, 1974, 3730/74

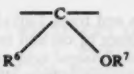
Int. Cl.^{2} C07C *49/76, 49/82, 69/16, 69/78*

U.S. Cl. 260—590 C **12 Claims**

1. A cyclopentane derivative of the formula:



wherein R^1 is hydrogen, alkanoyl of 1 to 4 carbon atoms, or benzoyl, A is alkylene of 1 to 12 carbon atoms, Z is a direct bond or oxygen or sulphur, X is ethylene or trans-vinylene, Y is carbonyl or



where R^6 is hydrogen or alkyl of 1 to 4 carbon atoms and R^7 is hydrogen, alkanoyl of 1 to 4 carbon atoms, or benzoyl, and R^8 is phenyl or naphthyl which is unsubstituted or substituted by halogen, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, or trihalomethyl.

4,088,696

PROCESSES FOR PRODUCING ALKENALS AND INTERMEDIATES THEREFOR

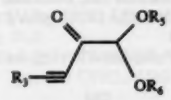
William L. Schreiber, Jackson, and Alan O. Pittet, Atlantic Highlands, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 664,830, Mar. 8, 1976, abandoned, which is a division of Ser. No. 383,579, Jul. 30, 1973, Pat. No. 3,922,309. This application Apr. 18, 1977, Ser. No. 788,355

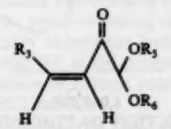
Int. Cl.^{2} C07C *47/20*

U.S. Cl. 260—601 R **1 Claim**

1. A process for the production of a trans-2-alkylidene-trans-3-alkenal which comprises the steps of:
(i) Hydrogenating a first oxo compound having the formula:



to provide a second oxo compound having the structure:



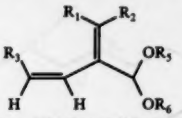
in the presence of a deactivated metallic hydrogenation catalyst selected from the group consisting of deactivated Palladium and deactivated Raney Nickel, said hydrogenation being carried out in an inert reaction vehicle, the concentration of said first oxo compound in said reaction vehicle being 20% by

weight or less of said reaction mass, said hydrogenation being carried out at a temperature of from about 0° C up to about 80° C and at a pressure of from about 1 up to about 5 atmospheres, the quantity of catalyst being from 1 up to about 10% by weight of said first oxo compound;

(ii) Reacting said second oxo compound with a phosphorous compound having the formula:

$$(R_7)_3P{=}C{-}R'$$

to form a mixture of cis and trans 2-alkylidene-cis-3-alkenal acetals represented by the structure:



said reaction between said second oxo compound and said phosphorous compound being carried out at a temperature of from about 0° C up to about 50° C; wherein R_5 and R_6 are the same or different lower alkyl; in one of the compounds of the resulting mixture, R_1 is lower alkyl and R_2 is hydrogen; in the other of the compounds of the resulting mixture R_2 is lower alkyl and R_1 is hydrogen; R′ is a lower alkyl equivalent to R_1 or R_2; and R_7 is phenyl;

(iii) Hydrolyzing said mixture of cis and trans 2-alkylidene cis-3-alkenal acetal to form a mixture of cis and trans-2-alkylidene-cis-3-alkenals, with dilute mineral acid or with an aqueous organic acid at a temperature of from about 0° C up to about 30° C, the concentration of said acid being in an amount sufficient to hydrolyze said mixture of cis and trans-2-alkylidene-cis-3-alkenal acetals to said mixture of said cis and trans-2-alkylidene-cis-3-alkenals; and

(iv) Isomerizing the cis-2-alkylidene-trans-3-alkenal in the said mixture of cis and trans-2-alkylidene-cis-3-alkenals to trans-2-alkylidene-trans-3-alkenal thereby creating one isomer, trans-2-alkylidene-trans-3-alkenal, by contacting said mixture of cis and trans-2-alkylidene-cis-3-alkenals with an isomerizing agent, which isomerizing agent is a mixture of acetic acid and an alkali metal iodide, the concentration range of alkali metal iodide in acetic acid being from 0.5% up to 2% by weight, the isomerization taking place at a temperature of from about 0° C up to about 30° C.

4,088,697

α-OXY(OXO) SULFIDES AND ETHERS

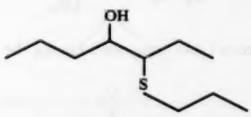
William J. Evers, Red Bank, and Howard H. Heinsohn, Jr., Hazlet, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 730,538, Oct. 7, 1976, Pat. No. 4,045,491. This application Mar. 31, 1977, Ser. No. 783,486

Int. Cl.² C07C *149/18*

U.S. Cl. 260—609 R **1 Claim**

1. 3-n-propylthio-4-heptanol having the structure:



4,088,698

PRODUCTION OF THIOPHENOLS

Norman A. Fishel, Olivette, and David E. Gross, St. Charles, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 3, 1977, Ser. No. 774,098

Int. Cl.² C07C *148/02*

U.S. Cl. 260—609 D **13 Claims**

1. A process for the production of thiophenols comprising reacting a phenol and hydrogen sulfide in vapor phase at a temperature in the range of 300° C. to 700° C. at a gas hourly space velocity of from 1 hr^{-1} to 3,000 hr^{-1} over a vanadium oxide catalyst to give a crude vapor product containing a thiophenol.

4,088,699

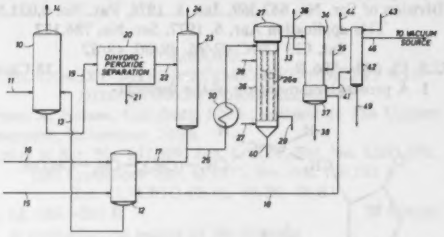
PRODUCTION OF ARALKYL TERTIARY HYDROPEROXIDES

John E. Anderson, Houston, Tex., and Ward J. Burkholder, Baton Rouge, La., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

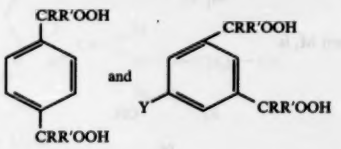
Continuation-in-part of Ser. No. 285,481, Aug. 31, 1972, abandoned. This application Apr. 22, 1974, Ser. No. 462,596

Int. Cl.² C07C *179/02*

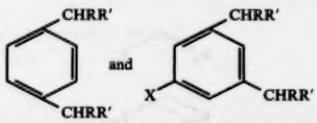
U.S. Cl. 260—610 B **19 Claims**



1. In a process for the production of an aralkyl tertiary polyhydroperoxide selected from the class consisting of



wherein R and R′ are alkyl radicals having 1–2 carbon atoms and Y is selected from the class consisting of hydrogen, —CHRR′, lower alkyl –CRR′OOH, halogen and —NO_2 by the oxidation of an aryl tertiary alkane selected from the class consisting of



wherein X is selected from the class consisting of hydrogen, —CHRR′, lower alkyl, halogen and —NO_2 with an oxygen containing gas at temperatures in the range of 50° - 150° C wherein there are produced, in addition to said aralkyl tertiary polyhydroperoxide, a corresponding aralkyl tertiary monohydroperoxide, a corresponding keto aryl tertiary alkanol, and a corresponding aryl tertiary dialkanol, and wherein the greater portion of said polyhydroperoxide is separated from the oxidation reaction product and a resultant recycle stream containing unreacted aryl tertiary alkane and aralkyl tertiary monohydroperoxide is returned to the oxidation reaction, the improvement comprising:

(a) introducing a portion of said recycle stream into an evaporative-stripper zone employing an inert stripping medium, said stripper medium being of a nature which enhances the removal of said aryl tertiary alkane and aralkyl tertiary monohydroperoxide from said portion of said recycle stream without undergoing deleterious side reactions,

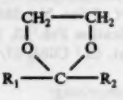
(b) separating, in said evaporative-stripping zone, said portion of said recycle stream into a first fraction containing the greater part of said aryl tertiary alkane and at least some of said monohydroperoxide contained in said portion of said recycle stream and a second fraction containing the greater part of said keto aryl tertiary alkanol, and
(c) returning said first fraction to said oxidation reaction.

4,088,700
PROCESS FOR THE HYDROGENOLYSIS OF DIOXOLANES

Lewis W. Watts, Jr., Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Sep. 27, 1976, Ser. No. 727,078
Int. Cl.[2] C07C 41/00
U.S. Cl. 260—611 R 13 Claims

1. In a liquid phase process for the hydrogenolysis of dioxolanes to produce the corresponding ethers, alcohols, or hydroxy ethers, in the presence of a catalyst, the improvement which comprises:
mixing and reacting the said dioxolane with hydrogen at a temperature within the range of from about −15° C. to about 125° C. and a pressure of from about 50 psia to about 2000 psia in the presence of a catalytic amount of a catalyst consisting essentially of:
(1) a halide of a Group III A element, and
(2) a supported platinum or rhodium hydrogenation catalyst, and wherein the said dioxolane has the formula:



wherein R_1 is selected from the group consisting of alkyl of from 1 to 20 carbon atoms, cyclohexyl, phenyl, tolyl and xylyl and R_2 is selected from the group consisting of hydrogen and alkyl of from 1 to 4 carbon atoms.

4,088,701
1,2,2,2-TETRAFLUOROETHYL-FLUOROMETHYL ETHER AND PROCESS FOR PREPARING IT

Günter Siegemund, Hofheim, Taunus, and Roman Muschaweck, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 10, 1976, Ser. No. 684,489
Claims priority, application Germany, May 12, 1975, 2520962
Int. Cl.[2] C07C 43/00, 43/12; A61K 31/08
U.S. Cl. 260—614 F 1 Claim

1. A 1,2,2,2-Tetrafluoroethyl-fluoroethyl ether of the formula

$$CF_3—CHF—O—CH_2F \quad \text{I}$$

4,088,702
PROCESS FOR PREPARING O-PHENYLPHENOL

Hideo Goto; Nobuyori Shibamoto, and Shunsaku Tanaka, all of Wakayama, Japan, assignors to Sugai Chemical Industry Company Limited, Wakayama, Japan

Filed May 4, 1976, Ser. No. 683,054
Claims priority, application Japan, May 14, 1975, 50-57806; Jun. 23, 1975, 50-77773
Int. Cl.[2] C07C 37/06
U.S. Cl. 568—747 8 Claims

1. A process for preparing o-phenylphenol by dehydrogenating at least one cyclohexanone dimer and o-cyclohexylphenol in the presence of a catalyst wherein the catalyst is prepared by a process which comprises the following steps:
(a) contacting a metal oxide carrier with an aqueous solution or dispersion of at least one compound capable of producing platinum or palladium on said carrier and containing 0.1 to 3.0% by weight of platinum or palladium based on the weight of the carrier;
(b) contacting said carrier with an aqueous solution or dispersion of 0.5 to 8.0% by weight, based on the weight of the carrier, of at least one alkali substance capable of producing an alkali metal oxide on said carrier;
(c) heating the carrier in nitrogen atmosphere at 300° to 400° C;
(d) heating the carrier in hydrogen atmosphere at a temperature of 300° to 400° C;
(e) contacting the resulting carrier having platinum or palladium and alkali metal oxide thereon with an aqueous solution or dispersion containing 0.05 to 5% by weight, based on the weight of the platinum or palladium and the alkali substance, of at least one sulfur containing compound selected from the group consisting of hydrogen sulfide, organic sulfur compounds, and alkali metal sulfides;
(f) heating the resulting carrier at 300° to 400° C; and
(g) contacting the carrier with a gas of said sulfur containing compound and an inert gas at 300° to 400° C.

4,088,703
RECOVERY OF PHENOL VALUES FROM PURIFICATION RESIDUES

Chuen Y. Yeh, Succasunna; F. Lewis Bohn, and Harry E. Ulmer, both of Morristown, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Oct. 18, 1973, Ser. No. 407,712
Int. Cl.[2] C07C 35/08
U.S. Cl. 568—835 10 Claims

1. A process for recovering phenol values as cyclohexanol from the purification residue obtained by the amine purification of cumene-phenol which comprises the steps of:
(a) hydrogenating said purification residue at a temperature of from about 40° to 260° C. in the presence of nickel catalyst to produce a hydrogenation product containing cyclohexanol, said catalyst being present in an amount greater than about 1 percent by weight of said purification residue, and
(b) distilling said hydrogenation product to recover cyclohexanol therefrom.

4,088,704
PRODUCTION OF FLUOROCARBONS EMPLOYING TWO CATALYST ZONES

Henry R. Nychka, E. Aurora, and Richard E. Eibeck, Orchard Park, both of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Jan. 21, 1977, Ser. No. 761,161
Int. Cl.[2] C07C 17/10
U.S. Cl. 260—653 12 Claims

1. A process for producing fluorocarbons having 1 to 3 carbons comprising the steps of:
(a) reacting chlorinated hydrocarbons having 1 to 3 carbons selected from the group consisting of perchlorinated hydrocarbons, highly chlorinated hydrocarbons and mixtures thereof with HF in the presence of a fluorination catalyst to produce an effluent containing fluorocarbon products and HCl; and
(b) reacting compounds having 1 to 3 carbons selected from the group consisting of underhalogenated hydrocarbons, non-halogenated hydrocarbons and mixtures thereof with O_2 and said effluent in the presence of an oxychlorination catalyst inert to HF to produce a second effluent containing fluorocarbon products and highly chlorinated and perchlorinated hydrocarbons.

4,088,705

CATALYST AND PROCESS FOR THE PRODUCTION OF CHLOROFLUORINATED HYDROCARBONS

Wim Johan Meindert Pieters, Morristown; William Ellis Gates, Green Township, County of Suffex; Emery John Carlson, Chatham, and John Edward Wilkalis, Morris Plains, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Feb. 11, 1977, Ser. No. 767,716
Int. Cl.[2] C07C 17/15
U.S. Cl. 260—653.7 8 Claims

1. In the process for the catalytic production of chlorofluorinated hydrocarbons in a one step process which comprises reacting a gaseous mixture of a hydrocarbon with CH groups susceptible to chlorination and which may be substituted with halo atoms selected from the group consisting of chlorine and fluorine, or mixtures thereof, together with HCl, HF and an oxygen-containing gas at temperatures within the range from about 300° to 600° C for a time sufficient to effect said reaction, the improvement comprising effecting said reaction in the presence of a catalytic composition comprising in combination at least about 60% by weight of said composition of magnesium and copper ions in combination with fluoride ion and at least one alkali metal in combination with chloride ion.

4,088,706

METHANOL CONVERSION TO PARA - XYLENE USING A ZEOLITE CATALYST CONTAINING AN OXIDE OF BORON, MAGNESIUM, PHOSPHORUS, OR MIXTURES

Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 655,330, Feb. 5, 1976, Pat. No. 4,049,573.
This application May 27, 1977, Ser. No. 801,127
Int. Cl.[2] C07C 1/20
U.S. Cl. 260—668 R 12 Claims

1. A process for producing hydrocarbons which compises contacting, under conversion conditions, a charge consisting essentially of 1 or more lower monohydric alcohols having up to 4 carbon atoms, the ethers derived therefrom or mixtures of said alcohols and ethers with a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, and having combined therewith:

(1) between about 0.25 and about 25 percent by weight of boron oxide; or

(2) between about 0.25 and about 5 percent by weight of boron oxide in combination with between about 2 and about 15 percent by weight of magnesium oxide; or

(3) between about 0.25 and about 10 percent by weight of phosphorus oxide in combination with between about 0.25 and about 25 percent by weight of boron oxide or magnesium oxide; or

(4) between about 0.25 and about 10 percent by weight of phosphorus oxide in combination with between about 0.25 and about 5 percent by weight of boron oxide and between about 2 and about 15 percent by weight of magnesium oxide, whereby there is formed a mixture comprising light olefinic hydrocarbons, monocyclic aromatic hydrocarbons, high in paraxylene content, and water and recovering said hydrocarbons.

4,088,707

RESIN COMPOSITION FOR POWDER COATINGS

Shigeru Takamori, Osaka; Kazutaka Yamashita, and Yoshinao Kono, both of Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Mar. 28, 1977, Ser. No. 781,856
Claims priority, application Japan, Apr. 16, 1976, 51-43186
Int. Cl.[2] C08L 63/00
U.S. Cl. 260—835 11 Claims

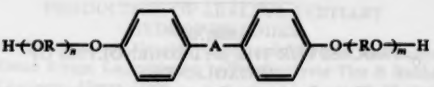
1. A resin composition for powder coating compositions consisting essentially of

(A) polycarboxylic acid obtained by reacting

(1) a diol compound formed by reacting

(i) an organic diisocyanate with

(ii) 1.5 to 4 moles, per one mole of said diisocyanate, of a polyoxyalkylene ether of a dihydric phenol having the formula:



wherein A is alkylene having 1 to 4 carbon atoms or carbonyl, R is alkylene having 2 to 4 carbon atoms, and each of m and n is a number of at least 1 and the sum of m and n is in the range of from 2 to 14,

with

(2) trimellitic acid or trimellitic anhydride in an amount of 1 to 4 moles of trimelltic acid or trimellitic anhydride per one mole of said diol compound, and

(B) polyepoxy compound.

4,088,708

THERMOPLASTIC, THERMOSETTING ELASTOMERIC COMPOSITIONS AND METHODS FOR MAKING THE SAME

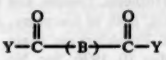
Changkiu Keith Riew, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 586,723, Jun. 13, 1975, abandoned. This application Feb. 23, 1976, Ser. No. 660,655
Int. Cl.[2] C08L 63/00
U.S. Cl. 260—836 50 Claims

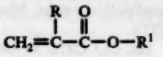
1. A composition comprising:

(A) 1 equivalent weight of at least one cycloaliphatic epoxy resin containing at least an average of about 1.7 epoxy groups per molecule, said resin having an epoxy equivalent weight from about 70 to about 6,000,

(B) from about 0.05 to about 0.5 equivalent weight of at least one amine-terminated liquid polymer containing an average from about 1.7 to about 3 amine groups per molecule, said groups being primary, secondary or a mixture thereof, and said polymer having the formula



wherein Y is a univalent radical obtained by removing hydrogen from an amine group of an aliphatic, alicyclic, heterocyclic or aromatic amine containing from 2 to 20 carbon atoms and at least two amine groups, at least two of said amine groups being primary, secondary or a mixture thereof, and B is a polymeric backbone comprising carbon-carbon linkages and containing polymerized units of at least one vinylidene monomer having at least one terminal $CH_2=C<$ group, said monomer being selected from the group consisting of (a) monoolefins containing 2 to 14 carbon atoms, (b) dienes containing 4 to 10 carbon atoms, (c) vinyl and allyl esters of carboxylic acids containing 2 to 8 carbon atoms, (d) vinyl and allyl ethers of alkyl radicals containing 1 to 8 carbon atoms, and (e) acrylic acids and acrylates having the formula



said R being hydrogen or an alkyl radical containing 1 to 3 carbon atoms, and said R^1 being hydrogen, an alkyl radical containing 1 to 18 carbon atoms, or an alkoxyalkyl, alkylthioalkyl or cyanoalkyl radical containing 2 to 12 carbon atoms, and

(C) from about 0.4 to about 1.5 equivalent weight of at least one anhydride containing from 4 to 24 carbon atoms per molecule.

4,088,709

PHOSPHORUS STABILIZED-POLYESTER-POLYCARBONATE MOLDING COMPOSITIONS

Robert W. Seymour; James C. Weaver, and Theodore F. Gray, Jr., all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 1, 1977, Ser. No. 812,934
Int. Cl.[2] C08L *67/00*
U.S. Cl. 260—860 4 Claims

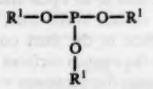
1. A composition comprising an admixture of

(A) from 99.9 to 98.0 weight percent, based on the weight of the composition, of a polymeric component comprising an admixture of

(2) from 5 to 50 weight percent, based on the weight of the polymeric component, bisphenol A polycarbonate having an inherent viscosity of at least 0.3, and

(2) from 95 to 50 weight percent, based on the weight of the polymeric component, poly(tetramethylene terephthalate) having an inherent viscosity of at least 0.5, and

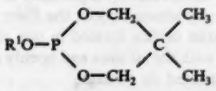
(B) from 0.1 to 2.0 weight percent, based on the weight of the composition which provides an improvement in the hardness, flexural strength and flexural modulus of said composition, of a phosphorous compound corresponding to the structure



(1)

where

R^1 is a monovalent alkyl radical having 2–18 carbon atoms, or a monovalent aryl or substituted aryl radical having 6–15 carbon atoms,



(2)

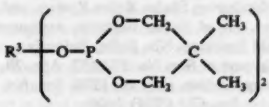
where

R^1 is the same as above,

(3)

where

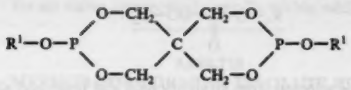
R^1 is the same as above, R^2 is a divalent alkyl radical having 2–12 carbon atoms or a divalent aryl or substituted aryl radical having 6–15 carbon atoms,



(4)

where

R^3 is a divalent alkyl or poly(alkylene oxide) radical having 2–12 carbon atoms or a divalent aryl or substituted aryl radical having 6–15 carbon atoms, or



(5)

where

R^1 is the same as above.

4,088,710

METHOD OF REDUCING GEL TIME OF POLYESTER THERMOSET RESINS AND PRODUCT THEREOF

Anthony J. Spak, Danbury, and Arthur J. Yu, Stamford, both of Conn., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 29, 1977, Ser. No. 782,593
Int. Cl.[2] C08L *67/06*
U.S. Cl. 260—870 20 Claims

1. In a thermosetting resin composition comprising an unsaturated polyester thermosetting resin, a polymerizable vinyl monomer, a vinylphosphonate flame retardant, and a polyester catalyst wherein the improvement comprises an effective amount of maleic anhydride for gel time reduction.

4,088,711

POLYCARBONATE/BLOCK COPOLYMER BLEND

William P. Gergen, and Sol Davison, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 693,463, Jun. 7, 1976, abandoned. This application May 5, 1977, Ser. No. 794,158
Int. Cl.[2] C08L *67/06*
U.S. Cl. 260—873 13 Claims

1. A composition comprising the admixture obtained by intimately mixing about 4 to about 96 parts by weight of a block copolymer and about 96 to about 4 parts by weight of an engineering thermoplastic resin so as to form at least partial continuous interlocking networks wherein:

a. said block copolymer comprises at least two monoalkenyl arene polymer end blocks A and at least one substantially completely hydrogenated conjugated diene mid block B, said block copolymer having an 8 to 55 percent by weight monoalkenyl arene polymer block content, each polymer block A having an average molecular weight of between about 5,000 and about 125,000, and each polymer block B having an average molecular weight of between about 10,000 and about 300,000; and

b. said engineering thermoplastic resin is a polycarbonate resin having a melting point over about 120° C.

4,088,712

PROCESS FOR PREPARING IMPACT RESISTANT POLYVINYL AROMATICS

Michael Lederer, Königstein, Taunus, and Wolfgang Strobel, Hofheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 12, 1976, Ser. No. 713,886
Claims priority, application Germany, Aug. 14, 1975, 2536262
Int. Cl.[2] C08F *4/28, 4/34, 255/06*
U.S. Cl. 260—878 R 4 Claims

1. A two-step process for preparing impact resistant vinyl aromatic graft copolymers having an improved notched impact strength and resistance to atmospheric corrosion which comprises as a first step mass polymerizing a reaction mixture of one or more vinyl aromatic monomers in the presence of an ethylene/propylene/tercomponent rubber at a pressure of 0.05 to 10 atmospheres gauge and in the presence of oxygen and as a second step suspension polymerizing said reaction mixture in the presence of a peroxy carboxylic acid ester having the formula

$$R_1-O-\overset{\overset{O}{\|}}{C}-O-R_2$$

wherein R_1 is selected from straight-chain and branched alkyl radicals of 6 to 20 carbon atoms, alkenyl radicals of 6 to 20 carbon atoms, aralkyl radicals of 7 to 12 carbon atoms and cycloalkyl radicals of 5 to 10 carbon atoms and which may be alkyl-substituted and R_2 is selected from alkyl radicals of 4 to 12 carbon atoms and aralkyl radicals of 7 to 12 carbon atoms.

4,088,713

THERMOPLASTIC POLYMER BLENDS COMPRISING EPDM AND EP

Richard Michael Herman, Elyria, and Martin Batiuk, Grafton, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Jun. 30, 1977, Ser. No. 811,519
Int. Cl.² C08L *23/16*
U.S. Cl. 260—897 A **11 Claims**

1. A thermoplastic polymer blend comprising

(1) 100 weight parts of at least one EPDM polymer consisting essentially of interpolymerized units of about 63 wt.% to about 85 wt.% ethylene, about 5 wt.% to about 37 wt.% propylene, and about 1 wt.% to about 15 wt.% of a diene monomer, said EPDM polymer having an unstretched crystallinity from about 1 to about 20 wt.% based upon EPDM polymer weight, and a Mooney viscosity from about 25 to about 110 (ML 1+8 at 125° C.), and

(2) from about 5 weight parts to 500 weight parts of at least one ethylene-propylene (EP) polymer consisting essentially of interpolymerized units of about 63 wt.% to about 85 wt.% ethylene, and about 15 wt.% to about 37 wt.% propylene, said EP polymer having an unstretched crystallinity from about 1 to about 20 wt.% based upon EP polymer weight, and a Mooney viscosity from about 25 to about 110 (ML 1+8 at 125° C.).

4,088,714

CROSS-LINKED MELT-FLOWABLE THERMOPLASTIC ELASTOMER BLEND COMPRISING EPR OR EPDM, POLYETHYLENE AND POLYPROPYLENE

Terrence Huff, Baytown, Tex., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Aug. 16, 1976, Ser. No. 714,371
Int. Cl.² C08L *23/16*
U.S. Cl. 260—897 A **21 Claims**

1. A cross-linked melt-flowable thermoplastic elastomer blend, comprising:

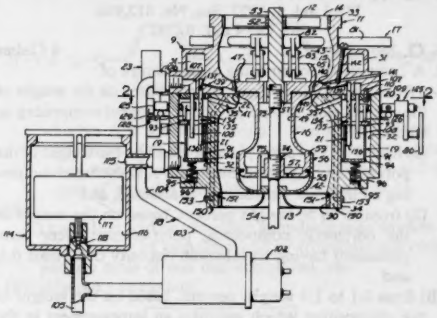
a blend of a monoolefin polymer elastomer of ethylene and propylene, with or without a copolymerizable polyene, and a cross-linkable low density polyethylene, having a density of no more than about 0.929 g/cc, essentially fully cured in the presence of a polypropylene to produce a non-melt-flowable discontinuous elastomer phase of substantially completely cross-linked monoolefin polymer elastomer and polyethylene intimately dispersed in a melt-flowable continuous phase of polypropylene, the weight ratio of the discontinuous elastomer phase to melt-flowable continuous phase being at least 1:1, the polymer components being respectfully present in amounts of about 20 to about 50% monoolefin polymer elastomer, about 15 to about 50% low density polyethylene and about 25 to about 50% polypropylene, based upon the total weight of the polymer compound.

4,088,715

VARIABLE VENTURI CARBURETOR

Clinton Graybill, P.O. Box 396, Superior, Mont. 59872

Filed Jan. 3, 1977, Ser. No. 756,018
Int. Cl.² F02M *7/02*
U.S. Cl. 261—36 A **34 Claims**



1. A variable venturi carburetor for an internal combustion engine, comprising:

a hollow body defining a longitudinal open air duct leading from an open intake end to an open discharge end;

a first annular venturi surface in the duct;

a second annular surface in the duct coaxial to the first venturi surface with the venturi surfaces forming an annular restricted air passage therebetween within the air duct;

throttle means operatively connected to at least one of the venturi surfaces for axially moving the venturi surfaces relative to each other to increase or decrease the cross section of the annular restricted air passage;

fuel reservoir means for receiving and storing a volume of liquid fuel therein at a preselected liquid level;

said fuel reservoir means having a plurality of independent fuel wells angularly situated about the duct;

an annular fuel outlet orifice formed in one of the venturi surfaces coaxial with the air duct and openly communicating with the restricted air passage;

a plurality of upright fuel suction tubes projecting downwardly into respective fuel wells for receiving fuel therefrom and for delivering the fuel to the annular outlet orifice at angularly spaced locations; and

fuel mixture control means operatively connected between the reservoir means and the tubes and responsive to the movement of the venturi surfaces relative to each other for varying the effective distance between the liquid level and the annular fuel outlet orifice to thereby vary the amount of fuel delivered to the annular fuel outlet orifice.

4,088,716

MATERIAL TREATING APPARATUS INCLUDING PNEUMO-HYDRAULIC VIBRATOR

Stoycho Mitrev Stoev; Metodi Stoyanov Metodiev; Lyubomir Vladimirov Kuzev; Petko Georgiev Vedrichkov; Ivan Mitrev Sapunarov; Vassil Vladimirov Vassilev; Spas Petrov Dimitrov; Vihar Assenov Gasharov; Sheko Kolev Russev, and Kostadin Georgiev Mitrev, all of Sofia, Bulgaria, assignors to Vish Minno-Geoloshki Institute- Nis, Sofia, Bulgaria

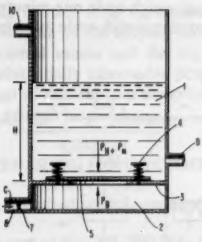
Continuation-in-part of Ser. No. 572,457, Apr. 28, 1975, abandoned. This application Aug. 24, 1976, Ser. No. 717,094
Int. Cl.² C02D *1/00*
U.S. Cl. 261—64 R **6 Claims**

1. In an apparatus for treating liquids and liquid suspensions including a working chamber adapted to hold liquid, and an air chamber adapted to hold pressurized air at least partially contiguous to said working chamber, the improvement comprising

wall means separating said air chamber and working chamber, said wall means having at least one aperture,

a valve element operatively mounted on said wall means and adapted to vibrate so as to alternately open and close said aperture,

said liquid in said working chamber exerting a predetermined hydrostatic pressure on said valve element in a first direction to close said aperture,



said pressurized air in said air chamber exerting a pneumatic pressure on said valve element in a second direction to open said aperture,

said hydrostatic and pneumatic pressure in said working and air chambers and the existing gravitational forces exclusively producing the driving forces which cause said valve element to vibrate.

4,088,717

COOLING TOWER

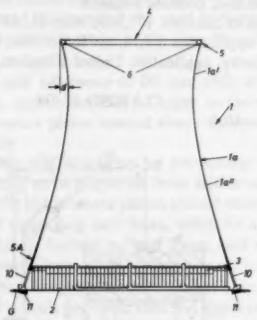
Heinz Rühl, Bochum, Germany, and Jean Gilbert, Nivelles, Belgium, assignors to GEA Kühturmbau und Systemtechnik Gesellschaft mit Beschränkter Haftung, Bochum, Germany

Continuation of Ser. No. 598,157, Jul. 22, 1975, abandoned. This application Feb. 22, 1977, Ser. No. 770,935

Claims priority, application Germany, Jul. 26, 1974, 2436063

Int. Cl.² B01F *3/04*

U.S. Cl. 261—109 **16 Claims**



1. A cooling tower comprising:

an upright annular main wall of hyperbolic outline centered on an upright axis and having a downwardly diverging air-admitting lower portion, an upwardly diverging air-discharging upper portion having an upper edge and an internal surface, and an intermediate portion of substantially smaller diameter than said upper and lower portions and defining a relatively small flow cross section; and

an insert in said upper portion immediately below said edge and above said intermediate portion, said insert comprising a solid annular wall extending radially inwardly from said internal surface toward said axis and axially upwardly at least to said upper edge, said insert defining at said upper portion a flow passage of greater flow cross section than said small cross section of said intermediate portion for air rising convectively axially within said main wall.

4,088,718

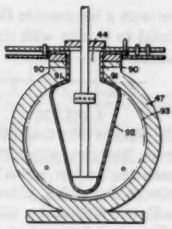
METHOD FOR FORMING INVOLUTE PLASTIC ARTICLES FROM THERMOPLASTIC SHEET MATERIAL

R. F. Mulvany, Jr., P.O. Box 1812, Sausalito, Calif. 94965

Continuation of Ser. No. 335,401, Feb. 23, 1973, abandoned. This application Apr. 30, 1976, Ser. No. 681,993

Int. Cl.² B29C *17/04*

U.S. Cl. 264—25 **14 Claims**



1. A method for forming involute plastic articles comprising:

heating a sheet of thermoplastic material in a controlled manner so as to maintain proper ambient conditions;

planarly supporting the heated sheet of thermoplastic material by placing the material between opposed platens which allow for transverse movement of the center of said heated sheet of thermoplastic material with respect to said platens, the compression between said opposed platens generally allowing for controlled planar movement of the thermoplastic material radially inwardly towards the center thereof;

transversely extending the center of the heated sheet of thermoplastic material into the interior of an involute female mold so that said material is drawn radially inwardly between the platens toward the center of the sheet and extended transversely at said center into an elongate conical shaped piece having an interior cavity;

monitoring the movement of the thermoplastic material radially inwardly toward the center of said sheet;

increasing the compression between the opposed platens responsively to said monitoring so that said compression is increased responsively to the movement of the thermoplastic material as the material moves radially inwardly toward the center thereof; and

pressurizing the interior cavity of the elongate conical shaped piece of thermoplastic material without substantially reheating said material to expand and press the thermoplastic material against the interior surface of the involute female mold.

4,088,719

DEVICE AND METHOD FOR FORMING A STRUCTURE, AND A STRUCTURE FORMED THEREBY

Jesse M. Heath, 5792 Evergreen Ave., Portage, Ind. 46368

Filed Mar. 21, 1977, Ser. No. 779,434

Int. Cl.² F27D *1/16*

U.S. Cl. 264—30 **2 Claims**

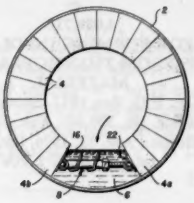
1. A method of forming a structure of structural modules such as brick comprising the steps of,

placing said structural modules in an arcuate pattern against a concave surface, leaving a space between two mutually facing spaced-apart modules,

inserting into said space a compression device,

extending the length of the compression device to compress

the modules together to hold them firmly against each other and against said concave surface,



filling said space with a hardenable fluent material, permitting said material to harden with the compression device embedded therein.

4,088,720

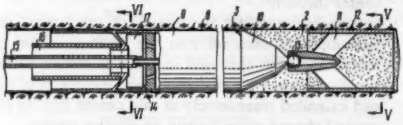
METHOD OF FORMING CASTINGS IN HOLES

Alexandr Dmitrievich Kostylev, ulitsa Derzhavina, 19, kv. 44; Konstantin Stepanovich Gurkov, ulitsa Derzhavina, 19, kv. 13; Vladimir Dmitrievich Plavskikh, ulitsa Gogolya, 233/1, kv. 34; Vladimir Vasilievich Klimashko, ulitsa Novogodnyaya, 44, kv. 24; Leonid Georgievich Rozhkov, ulitsa Sovetskaya, 50, kv. 58; Vladimir Alexandrovich Grigoraschenko, ulitsa Voskhod, 7, kv. 67; Vasily Vasilievich Filippov, ulitsa Severnaya, 23/2, kv. 8; Lazar Moiseevich Lipovetsky, ulitsa Stanislavskogo, 13, kv. 33; Valentin Nikitich Ardyshev, ulitsa Khmelnitskogo, 18/3, kv. 1, and Khaim Berkovich Tkach, ulitsa Gogolya, 17, kv. 49, all of Novosibirsk, U.S.S.R.

Continuation of Ser. No. 432,624, Jan. 11, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,462

Int. Cl.[2] B63B *35/04*

U.S. Cl. 264—32 3 Claims



1. A method of forming a casing in horizontal holes completely immersed in the ground and having annular cross-sectional profiles, said method comprising filling the hole through its entire cross-section with a self-setting wetted material for forming a casing, delivering said material into the hole under the action of a stream of a gaseous medium under pressure, compacting the material in the hole in the radial direction of the walls thereof by advancing a self-propelled device comprising a rod-shaped body through said hole and discharging a moistened compressed gas through and radially from said body against the casing being formed.

4,088,721

METHOD AND APPARATUS FOR CONTROLLING THE THICKNESS OF EXTRUDED STOCK

Anthony M. Apicella, Jr., Massillon, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 24, 1976, Ser. No. 726,712

Int. Cl.[2] B29C *17/00*

U.S. Cl. 264—40.4 4 Claims

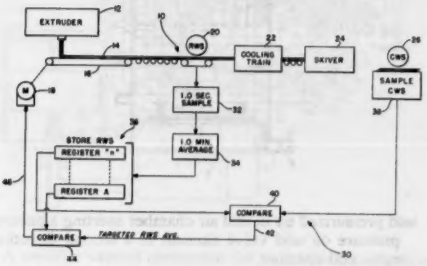
1. In a process comprising an extruder for providing a continuous sheet length of elastomeric extrusion, a variable speed take-away conveyor belt to vary the thickness of the extrusion as it exits the extruder, a running-weigh-scale to measure the weight per unit area of the continuous extrusion, a cooling train to set the extrusion, a skiver to cut the continuous extrusion into specific lengths, and a check-weigh-scale to measure the cut length weight, a method of controlling the thickness of the cut lengths of extruded elastomer comprising the steps of:

A. sampling the weight of the extrusion at the running-weigh-scale each second;

B. computing and storing one-minute averages of the running-weigh-scale samples;

C. sampling the weight of the cut lengths of extrusion at the check-weigh-scale;

D. comparing the check-weigh-scale value to the oldest stored running-weigh-scale one-minute average to obtain a targeted running-weigh-scale average;



E. comparing the targeted running-weigh-scale average to the newest stored running-weigh-scale one-minute average to obtain a deviation from the targeted value if one exists; and

F. converting the deviation from the targeted running-weigh-scale value to a control signal for increasing or decreasing the speed of the take-away belt to vary the thickness of the extrusion in accordance with the amount of deviation and the take-away speed of the belt.

4,088,722

METHOD FOR MOLDING A BLOCK OF POLYURETHANE FOAM HAVING A FLAT UPPER SURFACE

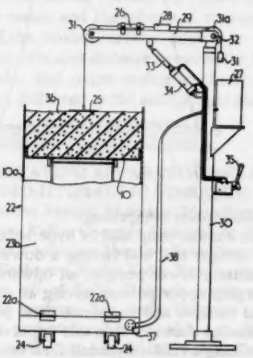
John Ernest Marjoram, Great Missenden, England, assignor to Dunlop Limited, London, England

Continuation of Ser. No. 471,969, May 21, 1974, abandoned. This application Jul. 3, 1975, Ser. No. 592,994

Claims priority, application United Kingdom, May 29, 1973, 25430/73

Int. Cl.[2] B29D *27/04*

U.S. Cl. 264—40.4 4 Claims



1. A method of moulding a discrete block of polyurethane foam having a substantially flat upper surface comprising:

depositing a polyurethane foam-forming reaction mixture on a shallow tray support positioned within shaping members and movable relative thereto,

applying a contact means to the top surface of said mixture to detect upward movement of said surface as a result of foam formation,

foaming said mixture,

detecting the upward movement of the top surface of said mixture during foaming and generating a signal to a power means to move said support downwardly inside of said shaping members at a rate corresponding to the rate of expansion of the mixture so that the sides of the mixture maintain sliding contact with the shaping members and are given the contour of the shaping members and maintaining said control means and the top surface of said mixture in a substantially unmovable position, said downward movement of said support stopping when said mixture ceases to expand.

4,088,723

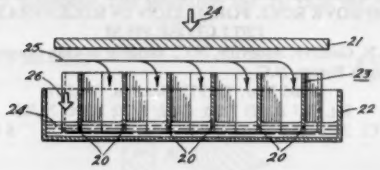
METHOD OF PREPARING HONEYCOMB INSULATION STRUCTURE

Richard V. Norton, Wilmington, Del., assignor to Suntech, Inc., Wayne, Pa.

Continuation-in-part of Ser. No. 500,966, Aug. 26, 1974, abandoned. This application Feb. 26, 1976, Ser. No. 661,907

Int. Cl.² B29D *3/02, 27/04*

U.S. Cl. 264—45.5 **4 Claims**



1. The method of preparing a honeycomb insulation structure comprising:

(a) introducing a foamable or foaming substance, into cells of a honeycomb having one of its open-end edges in a chemically and physically inert material whereby the resulting honeycomb insulation structure has a void along its open-end edge and thickness of the void is determined by the level of the inert material at the time the substance stabilizes;

(b) foaming said substance to fill said cells to overflowing with foam, and contacting an upper surface of said foam with a pressure platen spaced above an open end of said honeycomb;

(c) controlling said thickness by permitting some of said inert material to be displaced from said honeycomb;

(d) maintaining the pressure platen spaced above said honeycomb and stabilizing said foam, whereby a high density integral skin is formed on said foam, said skin having a density between about 20 pounds per cubic foot and the foam within a majority of the cells has a density between about two pounds per cubic foot and about twenty pounds per cubic foot; and

(e) separating the inert material from the honeycomb and stabilized foam.

4,088,724

EXTERNAL SIZING AND COOLING OF EXTRUDED TUBULAR PROFILES OF THERMOPLASTIC MATERIAL

Johannes Kuhnert, Okriftel, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

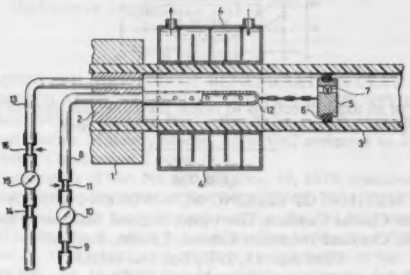
Filed May 9, 1974, Ser. No. 468,533

Claims priority, application Germany, May 12, 1973, 2324133

Int. Cl.² B29D *23/04;* **B29C** *25/00*

U.S. Cl. 264—85 **6 Claims**

1. In the method of sizing and cooling thick walled extruded hollow tubular articles formed of a thermoplastic material by passing the tubular article through an elongated sizing device having inlet and outlet ends and an internal bore through which the article is passed that is generally complementary to the desired external configuration of the article; producing an internal pressure in said tubular article to urge the article against the internal bore of said sizing device, while simultaneously cooling the article as it passes through said sizing device, wherein the improvement comprises producing the internal pressure and cooling the article by spraying and evaporating, within the article, as it passes through said sizing device, a chemically inert liquefied gas having a critical temperature in the range of from −150° C to 35° C.



2. The process as defined in claim 1 wherein said chemically inert liquefied gas is selected from the group consisting of nitrogen, carbon dioxide, trichlorofluromethane, difluorodichloromethane, and aliphatic halohydrocarbons.

3. The method as defined in claim 1 including the step of simultaneously cooling the exterior of said tubular article by passing liquefied gas through said sizing device.

4. The method as defined in claim 3 wherein said cooling step includes the step of locating radially movable cooling segment elements in said article; and said spraying step comprises spraying the liquefied gas under pressure within said segments to move the segments radially outwardly into contact with the inner wall of said article while simultaneously cooling said segments and the said article.

4,088,725

PROCESS FOR MAKING HIGH MOISTURE BARRIER POLYVINYL CHLORIDE FILM

Robert L. Bennington, Chester, and John T. Massengale, West Chester, both of Pa., assignors to FMC Corporation, Philadelphia, Pa.

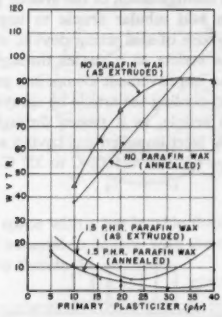
Division of Ser. No. 359,774, May 14, 1973, Pat. No. 3,875,164. This application Oct. 11, 1974, Ser. No. 513,965

Int. Cl.² B29D *7/24;* **B29C** *17/02*

U.S. Cl. 264—95 **7 Claims**

1. A process for preparing a self-supporting, plasticized, uncoated polyvinyl chloride film having a high resistance to moisture transmission comprising the steps of extruding as a film a melt containing a film-forming polyvinyl chloride resin and additives including from about 7 to 55 parts per hundred, based upon the weight of polyvinyl chloride resin, of plasticizer for the film-forming polyvinyl chloride resin and from about 0.5 to 4.0 parts per hundred, based upon the weight of the polyvinyl chloride resin, of a moistureproofing paraffin

wax, subsequently and while at a temperature within the orientation temperature range thereof elongating the film in at least


NO PARAFIN WAX (AS EXTRUDED)
NO PARAFIN WAX (ANNEALED)
1.5 P.H.R. PARAFIN WAX (AS EXTRUDED)
1.5 P.H.R. PARAFIN WAX (ANNEALED)
PRIMARY PLASTICIZER (pHr)

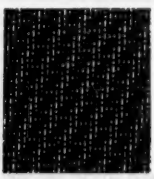
one of its axial directions to orient the molecules thereof and thereafter annealing the molecularly oriented film.

4,088,726

METHOD OF MAKING NON-WOVEN FABRICS

David Charles Cumbers, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 17, 1975, Ser. No. 568,836
Claims priority, application United Kingdom, Apr. 26, 1974, 18369/74; Sep. 20, 1974, 41066/74; Feb. 7, 1975, 5282/75
Int. Cl.² B29D *3/02*
U.S. Cl. 264—123 10 Claims



1. A method of making a thermally segmentally bonded fabric by passing a web comrising at least some distributed thermally bondable material through the nip between cooperating calender rolls at least one of which is heated and which have different surface land patterns, wherein some irregularity of bond pattern is provided by the surface pattern on one roll consisting of lands which are continuous and the surface pattern on the other roll consisting of lands which are isolated projections and the centroids of area of those projections concurrently in the nip being disposed at differing distances from the longitudinal axis of the nearest continuous land surface so that lands which oppose each other in the nip overlap to different extents.

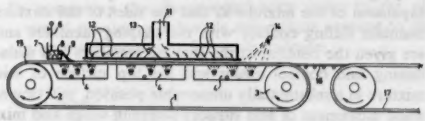
4,088,727

METHOD OF SOLIDIFYING MOLTEN MATERIAL

Herbert James Elliott, 63 Poulton Estate, Bradford-on-Avon, England

Filed May 13, 1976, Ser. No. 685,849
Claims priority, application Canada, Jun. 19, 1975, 229688
Int. Cl.² B29D *7/24, 7/02*
U.S. Cl. 264—130 16 Claims

1. Method for solidifying molten material into amorphous form while substantially avoiding crystallinity thereof and water occlusion therein, comprising pouring the molten material onto a uniformly extending solid planar substrate and in direct contact therewith and maintaining such molten material in static disposition on such uniformly extending substrate for controlled stage cooling, initially selectively mildly forming a solidified, crystallinity inhibiting, protective stabilizing skin on the melt surface of such molten material on the substrate without substantial disturbance and rippling of the molten surface and without disturbance of the uniformly extending disposition of the substrate and correspondingly of the static disposition of the molten material thereon and in the substantial absence of



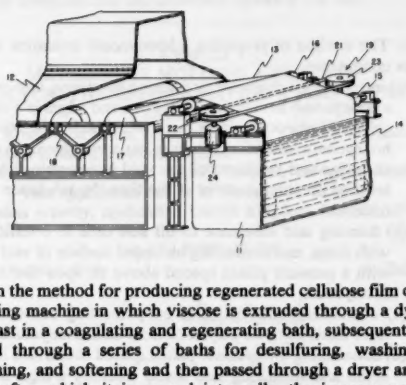
attendant liquid, thereafter finally solidifying such material by intensively cooling such material with a fluid coolant directed against the solidified protective skin likewise without disturbance of the uniformly extending disposition of such substrate and correspondingly of the static disposition of such material thereon, and recovering the solidified material in substantially amorphous form.

4,088,728

METHOD FOR IMPARTING GAUGE VARIATIONS TO IMPROVE ROLL FORMATION IN REGENERATED CELLULOSE FILM

John N. Godfrey, Asheville, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.

Filed Mar. 7, 1977, Ser. No. 774,857
Int. Cl.² B29D *7/26, 7/02, 7/20;* B29C *25/00*
U.S. Cl. 264—167 6 Claims



1. In the method for producing regenerated cellulose film on a casting machine in which viscose is extruded through a dye and cast in a coagulating and regenerating bath, subsequently passed through a series of baths for desulfuring, washing, bleaching, and softening and then passed through a dryer and dried after which it is wound into rolls, the improvement comprising improving the roll formation of the finished film by selectively varying the water content in discrete areas across the film between the last bath on the casting machine and before the film is passed to the dryer whereby randomized gauge variations are introduced in the finished film.

4,088,729

METHOD OF BONDING A PHENOL-BASED THERMOPLASTIC RESIN TO A CURED AND MOLDED THERMOSET PHENOLIC PLASTIC

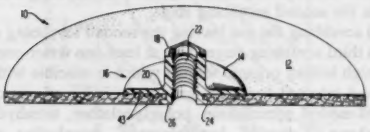
William F. Sherman, 2 Burtenmar Cir., Paxton, Mass. 01612

Continuation of Ser. No. 450,261, Mar. 11, 1974, abandoned.
This application Nov. 14, 1975, Ser. No. 632,026
Int. Cl.² B29B *1/14, 3/02*
U.S. Cl. 264—259 25 Claims

1. A method of bonding a phenol-based thermoplastic resin to a cured and molded thermoset phenolic plastic comprising the steps of:

heating the thermoplastic resin to a temperature between 450° and 550° F;

heating the thermoset plastic to a temperature between 150° and 200° F; and



pressurizing the thermoplastic resin and thermoset plastic against each other in a pressure range between 1000 and 1200 psi, whereby the thermoplastic resin and the thermoset plastic bond together chemically.

4,088,730

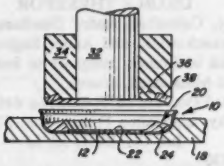
METHOD AND APPARATUS FOR FORMING CLOSURE INSERTS

Sheldon L. Wilde, Crawfordsville, Ind., assignor to H-C Industries Inc., Crawfordsville, Ind.

Division of Ser. No. 529,823, Dec. 5, 1974, Pat. No. 3,958,910, which is a continuation-in-part of Ser. No. 388,458, Aug. 15, 1973, abandoned. This application Apr. 21, 1976, Ser. No. 678,907

Int. Cl.² B29C *13/02*

U.S. Cl. 264—268 **4 Claims**



1. The method of forming thermoplastic material disposed in a closure shell into a predetermined shaped sealing insert with a cushion pad therein, said shell having a bottom portion and a sidewall comprising the steps of: providing an insert plunger having a working surface with at least a partially deformable interior portion, said working surface having an outer diameter generally equal to the diameter of said bottom portion; resiliently engaging the periphery of said working surface with the interior of said shell to enclose said material within the said working surface and bottom portion to form an outer boundary for said insert; and flexing said deformable portion of said working surface and pressing said working surface against said thermoplastic material to produce flow thereof, whereby said working surface assumes a shape complementary to said predetermined shape to form the insert.

4,088,731

METHOD OF SOFTENING NONWOVEN FABRICS

Ernest J. Groome, Covington, Va., assignor to Clupak, Inc., New York, N.Y.

Filed Jul. 28, 1976, Ser. No. 709,543

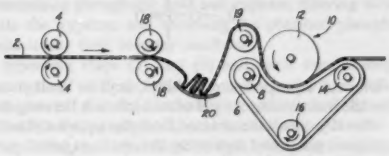
Int. Cl.² D06C *3/00*; B29C *17/02*

U.S. Cl. 264—282 **5 Claims**

1. The method of treating nonwoven fabrics to increase the softness and flexibility thereof in transverse directions, comprising the steps of:

feeding a web of said fabric through a stretching zone and applying longitudinal tension to said web, in the feed direction, sufficient to elongate the generally longitudinally extending filaments thereof and thereby reduce the transverse dimensions of said web and buckle the generally transversely extending filaments thereof; and

thereafter compacting a substantial proportion of said longi-



tudinally elongated filaments of said web in the longitudinal direction by shortening them in their longitudinal direction while maintaining said web against increase in thickness or creping.

4,088,732

IMPROVED METHOD OF BENEFICIATING CLAY BY REMOVAL OF TITANIUM AND IRON IMPURITIES

Robert Nelson Maynard; Bobby Ray Skipper, both of Cochran, and Nathan Millman, Macon, all of Ga., assignors to J. M. Huber Corporation, Locust, N.J.

Continuation of Ser. No. 613,772, Sep. 15, 1975, abandoned, which is a continuation of Ser. No. 527,650, Nov. 27, 1974, abandoned, which is a continuation of Ser. No. 255,913, May 22, 1972, abandoned, which is a continuation of Ser. No. 97,270, Nov. 27, 1970, abandoned, which is a continuation of Ser. No. 745,098, Jul. 16, 1968, abandoned. This application Jan. 21, 1977, Ser. No. 761,514

Int. Cl.² C01B *33/26*

U.S. Cl. 423—122 **2 Claims**

1. An improved method for beneficiating an East Georgio kaolin clay, said method comprising the steps of:

1. treating an aqueous suspension of the kaolin clay be adding to the aqueous kaolin clay suspension a peptizing agent selected from the group consisting of polyphosphates, carbonates, silicates, alkalies, basic salts, and combinations thereof, in an amount in excess of that required to obtain minimum Brookfield viscosity of the kaolin clay-water-dispersant system as defined by measurement at 60% solids with a Brookfield viscometer at 10 r.p.m. using a No. 1 spindle;
2. further treating the aqueous suspension of the East Georgia kaolin clay by adding to the aqueous clay suspension from 4 pounds to 15 pounds per ton of kaolin clay of a non-dispersing neutral salt selected from the group consisting of sodium chloride, potassium chloride, sodium nitrate, sodium sulfate, and combinations thereof;
3. separating the contaminants from the clay by sedimentation within the aqueous kaolin clay slurry at a kaolin clay solids content in excess of 20 percent by weight and recovering a clay product having a brightness in the range of from 91 to 95 after bleaching of said clay product.

4,088,733

PROCESS FOR LIQUID-LIQUID EXTRACTION OF COBALT FROM NICKEL

Achille De Schepper, Berkenlaan, and Antoine Van Peteghem, Lichtaart, both of Belgium, assignors to Metallurgie Hoboken-Overpelt, Brussels, Belgium

Filed Feb. 23, 1976, Ser. No. 660,546

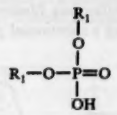
Int. Cl.² C01G *51/10*; C22B *23/04*

U.S. Cl. 423—139 **8 Claims**

1. A process for separating cobalt from nickel in an aqueous acid solution containing the above metals, which comprises contacting said solution with an organic phase comprising

(a) 65–98% by volume of a concentrated alpha-hydroxyoxime extractant, and

(b) 2–35% by volume of an organophosphoric acid of the general formula:



wherein R_1 represents an alkyl, aryl or aralkyl radical, while maintaining the pH of said solution between 1 and 6, whereby cobalt is extracted from the aqueous phase to the organic phase and separating the resultant cobalt pregnant organic phase from the aqueous phase.

4,088,734

REMOVAL OF HYDROGEN ARSENIDE

Claude Gadelle, Rueil-Malmaison; Jean-Pierre Laloz, Marly le Roi, and Irenee Seree de Roch, Rueil-Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Dec. 8, 1976, Ser. No. 748,410

Claims priority, application France, Dec. 8, 1975, 75 37717

Int. Cl.² B01D *53/34*

U.S. Cl. 423—210 **16 Claims**

1. A process for removing hydrogen arsenide H_3As from a gaseous effluent containing hydrogen arsenide as an impurity, wherein the gaseous effluent is washed at a temperature between 0° and 100° C, with an aqueous washing solution containing sodium hydroxide or potassium hydroxide, at least one salt or oxide of zinc or lead, the concentration of sodium hydroxide or potassium hydroxide being from 1 to 20% by weight of the said washing solution, and the zinc or lead content being from 0.01 to 10% by weight of the said solution.

4,088,735

PROCESS FOR PURIFYING GASES FROM THE GASIFICATION OF FOSSIL FUELS

Karl Bratzler, Bad Homburg; Alexander Doerges, Frankfurt am Main; Gerhard Hochgesand, Neu-Isenburg, and Manfred Kriebel, Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 593,818, Jul. 7, 1975, abandoned. This application Jan. 31, 1977, Ser. No. 764,316

Claims priority, application Germany, Jul. 10, 1974, 2433078

Int. Cl.² B01D *53/34*

U.S. Cl. 423—219 **5 Claims**

1. A process for purifying the raw gases produced in the gasification of fossil fuels by a treatment with steam and oxygen under superatmospheric pressure to remove, as catalyst deteriorating impurities, mono - and polyunsaturated hydrocarbons, mercaptans, HCN, HCl, H_2S, CS_2, COS AND NH_3 and to produce thereby a purified gas and an exhaust gas rich in H_2S comprising:

(i) indirectly effecting the cooling of the raw gas under superatmospheric pressure from a temperature of 150° - 170° C to ambient temperature;

(ii) separating and removing condensed water and hydrocarbons;

(iii) effecting scrubbing of the gas in a first scrubbing stage with added water and wherein the rate at which water is added is controlled to be just sufficient to remove the ammonia from the gas;

(iv) scrubbing the ammonia-free gas containing H_2S and other impurities by adding in the top of a second scrubbing stage in countercurrent to the ascending gas at least one high boiling organic solvent which is miscible with water and selected from the group consisting of pyrrolidone, N-methylpyrrolidone, polyglycolether, tetrahydrothiophene-1,1-dioxide, butyrolactone, morpholine and N-methyl-ε-caprolactam and to which sulfur has been added in an amount of 0.1 - 10 g per liter of the resulting scrubbing agent in which the rate of scrubbing agent addition is controlled to, thereby remove the mercaptans and the remainder of the catalyst deteriorating impurities except H_2S and residual COS from the gas;

(v) regenerating the laden scrubbing agent from the second scrubbing stage by flashing and heating and/or stripping with one of steam or inert gasses and recycling it for reuse in the second scrubbing stage;

(vi) scrubbing the gas leaving the second scrubbing stage in a third scrubbing stage using at least one water-containing high boiling organic solvent which is miscible with water and selected from the group consisting of pyrrolidone, M-methyl pyrrolidone, polyglycolether, tetrahydrothiophene-1,1-dioxide, butyrolactone, morpholine and N-methyl-ε-caprolactam, maintaining the water content of said organic solvent at 5-30 mol percent, to which solvent a soluble imidazole activator has been added which has a boiling point that is approximately as high as or higher than that of the high-boiling organic solvent, and adjusting the activator content of this scrubbing agent to 1-20% by weight, thereby effecting hydrolysis of COS and removing it together with H_2S selectively and entirely from said gas; and

(vii) regenerating the laden scrubbing agent from the third scrubbing stage by flashing and heating and/or stripping with one of steam or inert gases and recycling it for reuse in the third scrubbing stage.

4,088,736

PROCESS FOR PURIFYING A GAS CONTAINING HYDROGEN SULFIDE AND CONTACT MASSES USABLE THEREFOR

Philippe Courty, Colombes; André Deschamps, Noisy-le-Roi; Sigismond Franckowiak, and André Sugier, both of Rueil-Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Dec. 16, 1975, Ser. No. 641,352

Claims priority, application France, Dec. 27, 1974, 74 43202

Int. Cl.² B01D *53/34*

U.S. Cl. 423—230 **15 Claims**

1. A process for purifying a hydrogen sulfide containing gas, characterized in that said gas is passed in contact with an adsorption material comprising a shaped, substantially homogeneous intimate mixture providing by weight, 20–85% of zinc oxide, 0.9–50% of alumina, 0–30% of silica, and 2–45% of group IIA metal oxide, said mixture having been roasted at 500°–1000° C. for a stability increasing time so that at least 50% of said group IIA metal oxide is combined with alumina as metal IIA aluminate or silico-aluminate, and the major portion of said zinc oxide is uncombined with the other components of the absorption material, to absorb hydrogen sulfide, then the contact of the gas with the material is interrupted and an oxygen containing gas is passed in contact with the material for regeneration thereof, the passage is interrupted and a hydrogen sulfide containing gas is passed again in contact with the regenerated material.

4,088,737

DRY METHOD FOR RECYCLING IODINE-LOADED SILVER ZEOLITE

Thomas R. Thomas; Bruce A. Staples, and Llewellyn P. Murphy, all of Idaho Falls, Idaho, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

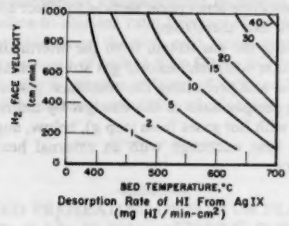
Filed Nov. 2, 1976, Ser. No. 737,650

Int. Cl.² B01D *53/34*

U.S. Cl. 423—240 **10 Claims**

1. A method of removing radioactive iodine from a waste gas stream and storing the same comprising: passing the waste gas through a silver-exchanged zeolite until the zeolite is loaded with iodine, passing hydrogen through the zeolite to remove the iodine as hydrogen iodide and regenerate the

zeolite, passing the hydrogen stream containing the hydrogen iodide through a lead-exchanged zeolite until the zeolite is



Desorption Rate of HI From AgIX (mg HI/min-cm²)

loaded with iodine and storing the radioactive-iodine-loaded zeolite.

4,088,738

PROCESS FOR PRODUCING PHOSPHORIC ACID USING MIXED ACID FEED AND A DICALCIUM PHOSPHATE INTERMEDIATE

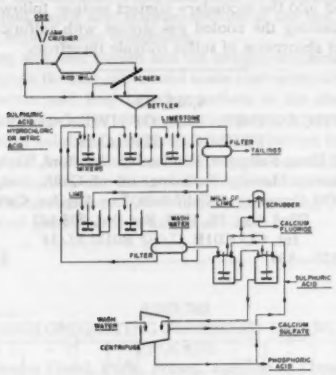
Douglas Oliver Hauge, Lafayette, Calif., assignor to United States Gypsum Company, Chicago, Ill.

Filed Apr. 8, 1976, Ser. No. 675,020

The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.

Int. Cl.² C01B *25/16*

U.S. Cl. 423—319 **14 Claims**



1. A process for the production of ortho phosphoric acid from phosphate-mineral-containing material through an intermediate precipitated dicalcium phosphate, comprising the steps of:

(1) Contacting phosphate-mineral-containing material with an aqueous leach acid mixture of sulfuric acid and a second acid selected from the group essentially consisting of hydrochloric acid and nitric acid, in approximate proportions of about ¾ mole of the second acid, about 1½ mole sulfuric acid and 52 moles water;

(2) separating a phosphoric acid leach liquor containing about 5–7% P_2O_5 from a remaining spent material;

(3) increasing the pH of the leach liquor to about 3–5 with a basic calcium compound to precipitate dicalcium phosphate, and separating the precipitated dicalcium phosphate;

(4) forming a fluid reaction medium of about 20% P_2O_5, about 4–12% sulfuric acid and about 60–40% water, at a temperature of about 25° C. to about 80° C.;

(5) adding a portion of the dicalcium phosphate comprising about 6–16% by weight of the fluid reaction medium so as to convert the dicalcium phosphate to phosphoric acid solution and to precipitate gypsum;

(6) withdrawing a portion of the fluid reaction medium containing phosphoric acid and gypsum, filtering to separate the gypsum, and returning the obtained phosphoric acid to the fluid reaction medium;

(7) repeating steps (5) and (6) and each time adding an amount of sulfuric acid comprising about 4–12% by weight of the fluid reaction medium until an about 30–45% P_2O_5 phosphoric acid is obtained; and

(8) separating an about 30–45% P_2O_5 phosphoric acid product.

4,088,739

PROCESS FOR PREPARING SYNTHETIC FERRIERITE

David Evan William Vaughan, Columbia, and Grant Campbell Edwards, Silver Spring, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 515,380, Oct. 16, 1974, Pat. No. 3,966,883. This application Jun. 25, 1976, Ser. No. 699,916

The portion of the term of this patent subsequent to Jun. 29, 1993, has been disclaimed.

Int. Cl.² C01B *33/28*

U.S. Cl. 423—329 **12 Claims**

1. A process for preparing synthetic ferrierite which comprises:

(a) preparing an alkaline reaction mixture which contains Group I and/or Group II cations, a source of alumina, a source of silica, water, powdered ferrierite seeds and promotional amounts of lithium cations; and

(b) heating the reaction mixture at a temperature of about 180° to 325° C to form ferrierite.

4,088,740

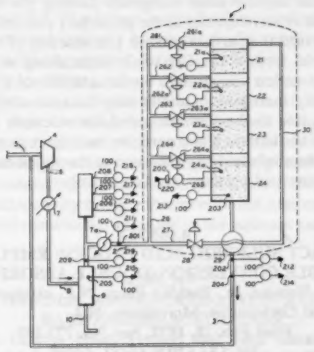
AMMONIA PRODUCTION

Larry D. Gaines, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 8, 1976, Ser. No. 739,761

Int. Cl.² C01C *1/04*

U.S. Cl. 423—359 **12 Claims**



1. A process for the production of ammonia by catalytic conversion of a nitrogen and hydrogen-containing gas mixture comprising

a. passing a feed stream containing nitrogen and hydrogen through a reactor in contact with an ammonia synthesis catalyst under ammonia-forming conditions to generate a product stream having a higher ammonia-concentration than the feed stream,

b. preheating at least part of the feed stream before it contacts the catalyst,

c. generating an equilibrium signal representative of the

equilibrium ammonia-concentration under the prevailing process parameters,

d. generating an outlet concentration signal representative of the actual ammonia-concentration in said product stream under the prevailing process parameters,

e. comparing the equilibrium signal and the outlet concentration signal and generating a control signal responsive thereto, and

f. manipulating the temperature profile in the reactor responsive to the control signal to maintain a predetermined relationship between the actual ammonia-concentration and the equilibrium ammonia-concentration.

4,088,741

CARBON BLACK PROCESS

Robert B. Takewell, Borger, Tex., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 663,423, Mar. 3, 1976, abandoned, which is a continuation of Ser. No. 553,782, Feb. 27, 1975, abandoned, which is a continuation of Ser. No. 305,646, Nov. 10, 1972, abandoned. This application Jan. 13, 1977, Ser. No. 758,895

Int. Cl.[2] C01B *31/02;* C09C *1/48*

U.S. Cl. 423—450 **3 Claims**

1. In a method of producing carbon black by the thermal decomposition and incomplete combustion of a hydrocarbon oil feedstock comprising:

(a) injecting a hydrocarbon oil feedstock vapor and air mixture into a primary reaction chamber;

(b) providing sufficient heat by the combustion of a hydrocarbon gas and air mixture for the thermal decomposition and incomplete combustion of said injected hydrocarbon feedstock;

(c) passing the hydrocarbon oil feedstock vapor and air mixture and the relative species produced by the thermal decomposition and incomplete combustion of said injected hydrocarbon oil feedstock into a secondary reaction chamber; and

(d) providing additional heat by the combustion of a hydrocarbon gas and air mixture for continuing thermal decomposition and incomplete combustion of said hydrocarbon feedstock in said secondary reaction chamber;

wherein the improvement comprises diluting the concentration of said relative species in the secondary reaction chamber so as to retard the particle growth and reaction of the carbon black nuclei formed thereby while maintaining substantially the same reaction temperature by the addition of a volume of substantially inert gases radially into the secondary reaction chamber prior to the termination of the reactions producing growth of the carbon black particles, said inert gases being at a temperature substantially the same as the temperature of the gases leaving said primary reaction chamber.

4,088,742

CONTACT SULFURIC ACID PROCESS EMPLOYING DOUBLE CONVERSION/DOUBLE ABSORPTION

Arthur C. Homme, Jr., Basking Ridge, N.J., assignor to Allied Chemical Corporation, Morristown, N.J.

Filed Feb. 25, 1977, Ser. No. 772,191

Int. Cl.[2] C01B *17/72, 17/68*

U.S. Cl. 423—522 **8 Claims**

1. The process for making sulfuric acid by catalytic oxidation of sulfur dioxide from a cold sulfur dioxide-containing gas stream from a wet gas purification plant involving the steps of:

(a) dividing said cold gas stream into a first and a second stream, said second stream comprising from about 1 to about 30 percent by volume of the total gas stream;

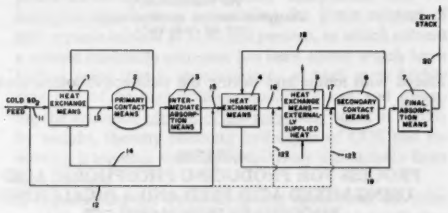
(b) preheating the first gas stream to the kindling temperature of the catalyst;

(c) passing the preheated first gas stream through a primary contact section containing catalyst to effect oxidation of part of the sulfur dioxide to sulfur trioxide;

(d) cooling the gas stream from the primary contact section to temperature between about 400° and about 550° F;

(e) contacting the gas stream so cooled with sulfuric acid in an intermediate absorption section to effect absorption of sulfur trioxide therefrom;

(f) combining the gas stream from the intermediate absorption section with said second gas stream obtained in step a), above, and preheating the combined gas stream to the kindling temperature of the catalyst by indirect heat exchange with hot gases from step g), below, augmented by indirect heat exchange with an external heat source, if necessary;



(g) passing the preheated combined gas stream through a secondary contact section containing catalyst to effect oxidation of sulfur dioxide contained therein to sulfur trioxide;

(h) cooling the gas stream from the secondary contact section to temperature between about 300° and about 450° F by indirect heat exchange with the gas stream to be introduced into the secondary contact section; followed by

(i) contacting the cooled gas stream with sulfuric acid to effect absorption of sulfur trioxide therefrom.

4,088,743

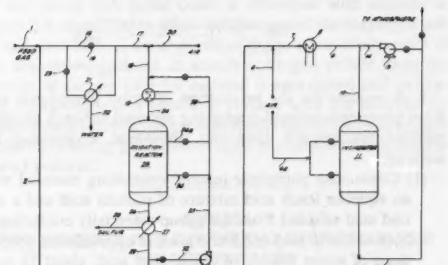
CATALYTIC INCINERATION OF HYDROGEN SULFIDE FROM GAS STREAMS

Robert H. Hass, Fullerton; Rowland C. Hansford, Yorba Linda, and Harvey Hennig, Fullerton, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Aug. 18, 1975, Ser. No. 605,642

Int. Cl.[2] C01B *17/50;* B01D *53/34*

U.S. Cl. 423—539 **21 Claims**



1. A process for oxidizing H_2S to SO_2 in a feed gas comprising non-condensable gases derived from condensing geothermal steam, said non-condensable gases containing H_2 and a minor proportion of H_2S, which process comprises:

(1) contacting said feed gas, in admixture with oxygen supplied in excess of the amount necessary to convert all of said H_2S to SO_2, with an oxidation catalyst at a temperature between about 300° and 900° F so as to convert at least some of said H_2S to SO_2, said oxidation catalyst comprising a vanadium oxide and/or sulfide as the essen-

tial active component supported on a non-alkaline porous refractory oxide selected from the class consisting of silica, acid metal phosphates, acid metal arsenates, crystalline or amorphous aluminosilicate hydrogen zeolites having a silica-to-alumina ratio between about 4:1 and 100:1, and combinations thereof, said contacting converting essentially none of said H_2S or SO_2 to SO_3, and

(2) recovering a gaseous effluent of reduced H_2S content, but still containing essentially all of said H_2.

4,088,744

INCREASED PREHEATING OF SULFUR PLANT GASES

Robert L. Reed; John W. Palm, and Ralph G. Ruth, all of Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 18, 1977, Ser. No. 788,478
Int. Cl.² C01B *17/04*
U.S. Cl. 423—573 G **4 Claims**

1. In a process for the catalytic recovery of free sulfur from a feed stream containing less than 45 mole percent hydrogen sulfide and contaminated with hydrocarbons or other harmful contaminants wherein all of said feed stream and an oxygen-containing stream is first passed through a combustion zone at a temperature sufficiently high to insure the burning of said contaminants and wherein the temperature of the flame in said combustion zone is maintained by addition of fuel gas and wherein the hot combustion products are cooled prior to Claus-type catalytic sulfur recovery as commonly known to the art by passing said combustion products through the tube side of a tube and shell waste heat removal apparatus containing a liquid/vapor heat transfer medium in the shell side, the specific improvement comprising:

passing said feed stream and the oxygen-containing stream through the tube side of said waste heat removal apparatus wherein said heat transfer medium in the shell side is selected such that it boils at a temperature in excess of 600° F, thus utilizing the excess heat of combustion by preheating said feed stream and said oxygen-containing stream prior to entry into said combustion zone to a temperature in excess of at least 600° F thereby conserving the amount of fuel gas required in said combustion zone.

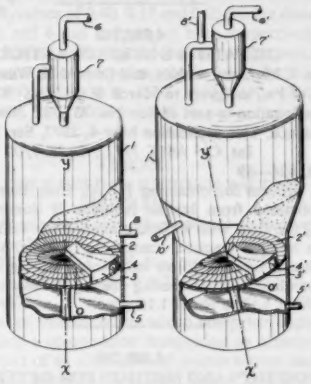
4,088,745

SELF-AGGLOMERATING FLUIDIZED BED REACTING PROCESS

Albert Andre Godel, Paris, France, assignor to Compagnie Industrielle de Procedes & d'Applications S.A., Neuchatel, Switzerland

Continuation-in-part of Ser. No. 265,925, Jun. 23, 1972, Pat. No. 3,840,345. This application May 24, 1974, Ser. No. 473,304
Int. Cl.² B07B *4/00*
U.S. Cl. 423—659 **15 Claims**

1. In a process wherein finely divided materials are reacted in a fluidized main bed above a grate and at a temperature involving self-agglomerating conditions under which slag sinks gradually through said fluidized bed down to said grate, an improved method of extracting said slag from said fluidized bed, comprising the steps of providing a shallow cell which rests on said grate and overlies a portion thereof and defines with said grate an enclosed space which is open at the bottom to said grate and adapted to accommodate an auxiliary shallow fluidized bed, said cell having an aperture communicating said fluidized beds with each other and through which slag enters said space, and an opening leading to an ashpit; rotating said grate and said cell relative to each other so that fluidized bed material and slag settled on said grate enter said space through said aperture; and blowing a reacting fluidizing gas through said grate into said fluidized beds for maintaining them in hydrostatic equilibrium with one another and for sorting and



extracting slag in said cell from said auxiliary shallow fluidized bed through said opening to enter the ashpit.

4,088,746

RADIOIMMUNOASSAY FOR THYROID-STIMULATING HORMONE (TSH)

Judith I. Blakemore, Mill Valley; Nathan Lewin, Corte Madera, and Michael W. Burgett, Half Moon Bay, all of Calif., assignors to Bio-Rad Laboratories, Inc., Richmond, Calif.

Filed Nov. 11, 1976, Ser. No. 742,391
Int. Cl.² A61K *43/00*; G01N *33/16*
U.S. Cl. 424—1 **10 Claims**

1. An improved radioimmunoassay method for the determination of thyroid-stimulating hormone in biological and other fluids which comprises mixing together in an aqueous solution (a) the sample containing thyroid-stimulating hormone to be determined, (b) radioactively labeled thyroid-stimulating hormone and (c) antibodies against thyroid-stimulating hormone so as to competitively bind said labeled and unlabeled thyroid-stimulating hormone, thereafter adding polyacrylamide particles of about 0.1–10 microns in size having covalently bonded thereto a second antibody immunologically reactive with the said first antibody against thyroid stimulating hormone for reaction therewith to produce a two-phase system comprising a solid phase containing said bound portion of labeled and unlabeled thyroid-stimulating hormone and a liquid phase containing the unbound portion of labeled and unlabeled thyroid-stimulating hormone, separating the two phases from each other and measuring the radioactivity of either phase, the value of said radioactivity being a function of the concentration of said thyroid-stimulating hormone in the aqueous sample.

4,088,747

PHENOLIC AMINO-CARBOXYLIC ACID RADIOPHARMACEUTICALS

Frederick Charles Hunt, Oatley, and John Gerald Wilson, Strathfield, both of Australia, assignors to Australian Atomic Energy Commission, Coogee, Australia

Filed Feb. 3, 1976, Ser. No. 655,034
Claims priority, application Australia, Feb. 19, 1975, PC0655; Jul. 29, 1975, PC2552
Int. Cl.² A61K *27/00, 43/00*
U.S. Cl. 424—1 **10 Claims**

1. A radiopharmaceutical for imaging hepatobiliary function comprising a lipo-soluble metal chelate in which the metal is a pharmaceutically acceptable radio isotope for an animal and the chelating agent is selected from the group consisting of an ethylene diamine di(hydroxy phenyl carboxylic acid), a salt

thereof, a di(hydroxy benzyl) ethylene diamine dicarboxylic acid and a salt thereof.

4,088,748

HEPATITIS B SURFACE ANTIGEN

William J. McAleer, Ambler, and Edward H. Wasmuth, Telford, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 737,931, Nov. 2, 1976, abandoned. This application May 4, 1977, Ser. No. 793,662

Int. Cl.[2] A61K *39/12*; C12K *7/00*

U.S. Cl. 424—89 11 Claims

1. A process for obtaining HB_sAg from human biological fluid obtained from human hepatitis B donors comprising treating the fluid with sufficient ammonium sulfate to precipitate an antigen fraction comprising HB_sAg, subjecting the precipitated fraction to an isopycnic banding and to a rate zonal banding, and recovering HB_sAg in the density range of from about 1.13 to about 1.16 g/cc.

4,088,749

COMPOSITION AND METHOD FOR DETERMINATION OF PREGNANCY

Lea Grundman, Jerusalem, Israel, assignor to Rafa Laboratories Ltd., Israel

Filed Apr. 26, 1976, Ser. No. 680,579

Claims priority, application Israel, May 2, 1975, 47223

Int. Cl.[2] G01N *31/00, 33/16*

U.S. Cl. 424—12 3 Claims

1. Method of producing a seriodiagnostic composition for determining whether or not a female is pregnant, said composition consisting essentially of solid neutral particles having γ-globulin adsorbed thereon, said γ-globulin being coupled to one functional group of a bi-functional coupling agent having two functional groups with different reactivities, the other of said functional groups being coupled to human chorionic gonadotropin, which comprises linking one of the functional groups of said coupling agent at a temperature of about 0°–10° C and at a pH of 5.4–7.4 to said human chorionic gonadotropin and then linking said coupling agent at the other of its functional groups at a temperature of about 30°–60° C and at a pH of about 7.6–9.2 to said γ-globulin which has been adsorbed on said neutral particles.

4,088,750

METHOD AND PREPARATION FOR INCREASING BIOAVAILABILITY OF DIGOXIN

Ronald M. Cresswell, Raleigh, and Elvin A. Holstius, Greenville, both of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation-in-part of Ser. No. 444,961, Feb. 22, 1974, abandoned, and a continuation-in-part of Ser. No. 453,000, Mar. 19, 1974, abandoned. This application Jan. 28, 1976, Ser. No. 653,246

Int. Cl.[2] A61K *9/48, 31/705*

U.S. Cl. 424—37 9 Claims

1. In the method of increasing the bioavailability of digoxin in a human suffering from cardiac insufficiency which comprises administering to the upper gastrointestinal tract of said human a capsule comprising a soft gelatin capsule shell containing a solution comprising digoxin in a solvent system, the improvement wherein the digoxin is in solution at a concentration of at least 0.25 mg digoxin/ml solution, said capsule containing the solution of the solvent system comprising the following ingredients in about the % amount set forth by weight:

polyethylene glycol 400 (90%)

absolute ethanol — (6%)

propylene glycol — (3%)

water — (1%) and 0.2 mg digoxin

said solvent system being pharmaceutically acceptable to the gastrointestinal tract and able to dissolve digoxin to form a solution and is not substantially destructive of the capsule shell, the solution of said digoxin and solvent system being encapsulated in said shell and said capsule shell capable of being dissolved in the upper gastrointestinal tract of said human, said capsule with said solution providing a bioavailability of digoxin substantially equal to 0.25 mg digoxin administered in tablet form in the same manner as the capsule.

4,088,751

SELF-HEATING COSMETIC

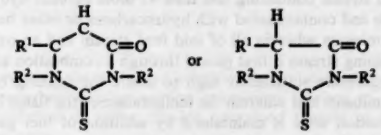
Divaker B. Kenkare, South Plainfield; Frederick W. Gray, Summit, and Durland K. Shumway, Piscataway, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 242,191, Apr. 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 20,384, Mar. 17, 1970, abandoned. This application Nov. 3, 1975, Ser. No. 628,451

Int. Cl.[2] A61K *7/06*

U.S. Cl. 424—47 15 Claims

1. A dispensing apparatus or article for a self-heating cosmetic comprising constituents of a cosmetic composition stored in separate zones, in one of which there is present a compound which acts as a reductant, said compound having the formula:



wherein R^1 is hydrogen, lower alkyl, phenyl, lower hydroxyalkyl, lower alkoxy, poly-lower alkoxy having 2 to 10 alkoxy groups, lower alkoxy-lower alkyl, poly-lower alkoxy-lower alkyl having 2 to 10 alkoxy groups, or lower alkanoyloxy and R^2 is hydrogen, lower alkyl, phenyl, lower hydroxyalkyl, lower alkoxy-lower alkyl, poly-lower alkoxy-lower alkyl having 2 to 10 alkoxy groups or lower alkanoyl, and in the other of which there is present an oxidizing agent exothermically reactive with the reductant to generate heat and heat the cosmetic when it is dispensed, and means for dispensing contents from both zones so that they are brought into contact with each other and with cosmetic ingredients of the cosmetic to produce a heated cosmetic, said reductant and oxidizing agent being employed in amounts relative to each other which range from stoichiometric proportions up to 50% in excess thereof of either said reductant or oxidizing agent.

4,088,752

ORAL COMPOSITION FOR PLAQUE AND CARIES INHIBITION

Hans Rudolf Muhlemann, Zurich, and Hans Schmid, Muttenz, both of Switzerland, assignors to Gaba AG, Basel, Switzerland

Filed Jun. 2, 1975, Ser. No. 583,125

Claims priority, application Switzerland, May 31, 1974, 7516/74

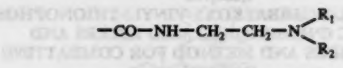
Int. Cl.[2] A61K *7/16, 7/18*

U.S. Cl. 424—57 8 Claims

1. An oral fluoride-free dentifrice composition selected from the group consisting of toothpastes, transparent toothpastes, gels, mouth rinses, sprays, and chewing gum, for plaque and caries inhibition, said composition containing a salt formed by reaction of an oxo-acid of phosphorus with an organic amine base, said organic amine base being of the formula R-X, where R is selected from the group consisting of an alkyl group having 6 to 30 carbon atoms, an alkenyl group having 6 to 30 carbon atoms, an alkoxy group having 2 to 30 carbon atoms, an alkylol group having 2 to 30 carbon atoms, a substituted or unsubstituted, saturated or unsaturated aralkyl group substituted with an alkyl group having a chain length of 2 to 30 carbon atoms, and X is selected from the group consisting of:

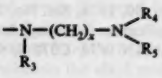
(a) $(NH_2)_y$ where y is an integer from 1 to 3,

(b) the grouping



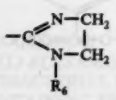
where R_1 and R_2, which can be the same or different, are selected from the group consisting of hydrogen, acyl, alkyl, alkoxy, alkenyl, alkylol, aralkyl and cycloalkyl groups,

(c) the grouping



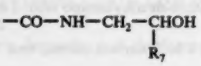
where R_3, R_4 and R_5, which can be the same or different, are selected from the group consisting of hydrogen, acyl, alkyl, alkoxy, alkenyl, alkylol, aralkyl and cycloalkyl groups, and x is an integer from 1 to 3,

(d) the grouping



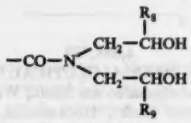
where R_6 is selected from the group consisting of hydrogen, acyl, alkyl, alkoxy, alkenyl, alkylol, aralkyl and cycloalkyl groups,

(e) the grouping



where R_7 is selected from the group consisting of hydrogen and lower alkyl groups, and

(f) the grouping



where R_8 and R_9, which can be the same or different, are selected from the group consisting of hydrogen and lower alkyl groups.

4,088,753

METHOD OF OBTAINING A SPLENIC COMPOSITION WHICH INHIBITS PLATELET FUNCTION AND SAID COMPOSITION

Laurence Pierpont Parmer, Lakewood, N.J.

Continuation-in-part of Ser. No. 568,593, Apr. 16, 1975, abandoned. This application May 20, 1976, Ser. No. 688,224

Int. Cl.[2] A61K *35/28*

U.S. Cl. 424—95 12 Claims

1. A process of extracting and isolating a material from a spleen which inhibits platelet function, which comprises:

subjecting the spleen to a polar solvent having a high dielectric constant of at least 20, and

subjecting the resultant polar solvent filtrate to a silica gel thin-layer chromatograph process wherein a benzene eluting solvent is utilized for separating and recovering the desired material therefrom, said material having an R_f value ranging from about 0 to 0.73.

9. A lipid material for inhibiting platelet function derived from an animal spleen and having a melting point not in excess of 70° C; said material being extractable by and soluble in acetone, benzene and ether; said material and the dyes butter yellow, sudan red 6 and indophenol blue, when subjected to a 250 micron thick Analtech silica gel G.F. plate employing a benzene eluting solvent, yielding an R_f value of 0.66 for said material and R_f values of 0.40, 0.17 and 0.05 for the dyes butter yellow, sudan red 6 and indophenol blue, respectively; and, said material further depicting at least one of the peaks on an infra red spectra whose wavelengths in cm^{-1} include 3560, 3150, 2900, 2860, 2800, 2300, 1580, 1460, 1440, 1360, 1340, 1300, 1230, 1210, 1140, 1010 and 845.

4,088,754

WATER-SOLUBLE CERIUM (CEROUS) SALTS IN BURN THERAPY

William W. Monafo, St. Louis, Mo., assignor to Research Corporation, New York, N.Y.

Filed Mar. 2, 1976, Ser. No. 663,052

Int. Cl.[2] A61K *33/24, 31/625*

U.S. Cl. 424—131 6 Claims

1. A method of treating burns which comprises applying to the burn surface a composition comprising an effective antibacterial amount of an admixture of cerous nitrate and silver sulfadiazine, said composition being a semi-soft or cream-like, water-dispersible hydrophilic composition and containing said admixture therein as a dispersion or emulsion, said cerous nitrate being present in said composition in an amount in the range 0.05–4% by weight and said silver sulfadiazine being present in said composition in an amount in the range 0.1–10% by weight.

4,088,755

MEDICAMENT FOR REMEDYING SCHIZOPHRENIA

Kazutoyo Inanaga, Kurume, and Yoshio Miyamoto, Takarazuka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed May 24, 1976, Ser. No. 689,144

Claims priority, application United Kingdom, May 23, 1975, 22706/75

Int. Cl.[2] A61K *31/54, 37/00*

U.S. Cl. 424—177 9 Claims

1. A method for the treatment of a patient suffering from schizophrenia, which comprises administering to said patient an effective amount of L-pyroglutamyl-L-histidyl-L-prolinamide or a physiologically acceptable salt thereof and a phenothiazine neuroleptic agent selected from the group consisting of chlorpromazine, thioridazine, promazine, trifluoperazine, levomepromazine, thioproperazine, fluphenazine and perphenazine, the weight ratio to L-pyroglutamyl-L-histidyl-L-prolinamide or a physiologically acceptable salt thereof in terms of free L-pyroglutamyl-L-histidyl-L-prolinamide to the phenothiazine neuroleptic agent being from 1:25000 to 50:30.

4,088,756

PHARMACEUTICAL COMPOSITION AND PROCESS OF TREATMENT

John J. Voorhees, Ann Arbor, Mich., assignor to The Regents of the University of Michigan, Ann Arbor, Mich.

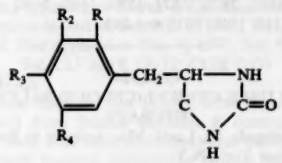
Continuation-in-part of Ser. No. 324,012, Jan. 16, 1973, abandoned, which is a continuation-in-part of Ser. No. 425,338, Dec. 17, 1973, abandoned. This application Nov. 28, 1975, Ser. No. 636,037

Int. Cl.[2] A61K *31/70*

U.S. Cl. 424—180 2 Claims

1. A process for treating proliferative skin diesases which comprises administering to the afflicted human or animal a composition comprising at least two active compounds in association with a pharmaceutical carrier, said compounds being present in an amount in the range of about 0.1% to about 10% w/v which is effective to alleviate a proliferative skin disease, at least one of said compounds being selected from a first group consisting of adenosine, 2'-deoxyadenosine, 2',3'-isopropylidene adenosine, toyocamycin, 1-methyladenosine, N-6-methyladenosine, adenosine N-oxide, 6-methylmercap-

topurine riboside, 6-chloropurine riboside, 5'-adenosine monophosphate, and at least one of said compounds being selected from a second group consisting of papaverine, diazepam, 1-ethyl-4-(isopropylidenehydrazino)-1$_H$-pyrazolo-(3,4-b)-pyridine-5-carboxylic acid, ethyl ester, HCl, and a compound having the formula:



wherein R is halogen, hydrogen, lower alkyl and lower alkoxy; R_2, R_3 and R_4 taken independently of each other are hydrogen, lower alkoxy or hydroxy-lower alkoxy and provided that R_2, R_3 and R_4 taken independently of each other represent at least one oxygenated substituent; R, R_2, R_3 and R_4 taken as an adjacent pair is methylenedioxy and the optical antipodes thereof.

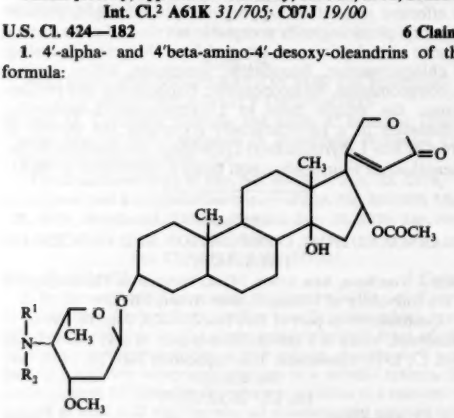
4,088,757

4 ALPHA- AND 4 BETA-AMINO-4-DESOXYOLEANDRINS, AND PHARMACEUTICAL COMPOSITION CONTAINING SAME

Rudolf Petersen, Wohltorf, Germany, assignor to Beiersdorf Aktiengesellschaft, Hamburg, Germany

Filed Jan. 13, 1977, Ser. No. 758,993
Claims priority, application Germany, Jan. 28, 1976, 2603046
Int. Cl.[2] A61K *31/705*; C07J *19/00*
U.S. Cl. 424—182 **6 Claims**

1. 4'-alpha- and 4'beta-amino-4'-desoxy-oleandrins of the formula:



wherein R^1 and R^2, which may be the same or different, are individually selected from the group consisting of hydrogen, or a lower alkyl group with 1–4 carbon atoms, or R^1 and R^2 together with the nitrogen atom form pyrrolidino, piperidino, or morpholino; and the physiologically compatible acid addition salts thereof.

6. A pharmaceutical composition containing an effective amount of at least one 4'-amino-4'desoxy-oleandrin according to claim 1 and a physiologically compatible substance.

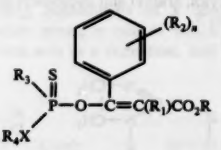
4,088,758

O-(1-PHENYL-2-CARBALKOXY-VINYL)-THIONOPHOSPHORIC (PHOSPHONIC) ACID ESTERS AND ESTER-AMIDES AND METHOD FOR COMBATTING INSECTS

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Rolf Schröder, all of Wuppertal; Paul Uhrhan, Cologne; Bernhard Homeyer, Leverkusen, and Ingeborg Hammann, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jul. 30, 1976, Ser. No. 709,994
Claims priority, application Germany, Aug. 20, 1975, 2536977
Int. Cl.[2] A01N *9/36*; C07F *9/40, 9/165*
U.S. Cl. 424—212 **9 Claims**

1. An O-alkyl-O-(1-phenyl-2-carbalkoxyvinyl)-thionophosphoric(phosphonic) acid ester or esteramide of the formula



(I)

in which
R is alkyl with 1 to 3 carbon atoms,
R_1 is hydrogen or methyl,
R_2 is methyl, ethyl, methoxy, ethoxy, methylthio, ethylthio, chlorine, bromine, iodine, cyano or phenyl,
R_3 is alkyl, alkylthio or alkylamino with 1 to 5 carbon atoms, or phenyl,
R_4 is alkyl with 1 to 5 carbon atoms, and
n is 0, 1, 2 or 3.

8. A method of combating insects or acarids which comprises applying to the insects or acarids or to a habitat thereof an insecticidally or acaricidally effective amount of a compound according to claim 1.

4,088,759

INJECTABLE PHARMACEUTICAL SOLUTIONS

Heinrich Woog, Ludwigshafen am Rhein; Werner Gruber, Birkenau, and Werner Rothe, Hockenheim, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

Filed Nov. 16, 1976, Ser. No. 742,303
Claims priority, application Germany, Dec. 12, 1975, 2556001
Int. Cl.[2] A61K *31/56*
U.S. Cl. 424—240 **12 Claims**

1. An injectable alkaline solution comprising
(a) as active ingredient, at least one alkali metal canrenoate or a mixture of an alkali metal canrenoate and an additional diuretic, and
(b) water and a physiologically compatible alkaline buffer, wherein the buffer has alow buffer capacity and gives a pH range of 10.2 to 11.2, and is selected from sodium or potassium phosphate, sodium or potassium carbonate, and sodium or potassium glycinate.

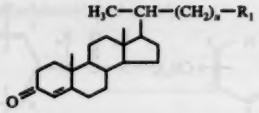
4,088,760

TESTOSTERONE 5α-REDUCTASE INHIBITORS

Harvey D. Benson, and Thomas R. Blohm, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed Jun. 23, 1976, Ser. No. 698,824
Int. Cl.[2] C07J *9/00*; A61K *31/56*
U.S. Cl. 424—242 **12 Claims**

1. A method of treating acne and oily skin in a patient in need thereof which comprises administering to said patient an effective amount of a compound of the formula:



wherein *n* is an integer of from 0 to 4; R_1 is $-COOR_2$, $-CONR_3R_4$, $-CHO$ or $-CH_2OR_5$; R_2 is hydrogen, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, or benzyl; each of R_3 and R_4 is hydrogen or a straight or branched lower alkyl group of from 1 to 4 carbon atoms; and R_5 is hydrogen, alkylcarbonyl wherein the alkyl moiety has from 1 to 20 carbon atoms and is straight or branched, benzoyl, phenylalkylcarbonyl wherein the alkyl moiety has from 1 to 6 carbon atoms and is straight or branched, or cycloalkylcarbonyl wherein the cycloalkyl moiety has from 5 to 10 carbon atoms.

4,088,761

3-[(1,3-DITHIIN-5-YL)-ACETAMIDO]-CEPHALOSPORINS AND ANTIBACTERIAL COMPOSITIONS CONTAINING THEM

Christian Berger, Plessis Robinson; Daniel Farge, Thiais, and Claude Moutonnier, Plessis Robinson, all of France, assignors to Rhone-Poulenc Industries, Paris, France

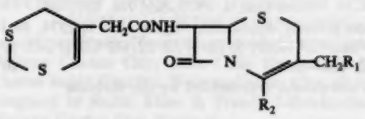
Filed Jan. 17, 1977, Ser. No. 759,906

Claims priority, application France, Jan. 19, 1976, 76 01230

Int. Cl.[2] C07D *501/36;* A61K *31/545*

U.S. Cl. 424—246 **6 Claims**

1. Cephalosporin derivatives of the formula:



in which R_1 represents acetoxy, (5-methyl-1,3,4-thiadiazol-2-yl)-thio, (1-methyl-tetrazol-5-yl)-thio or [1-(2-hydroxyethyl)-tetrazol-5-yl]-thio and R_2 represents carboxyl, or R_1 represents pyridinio and R_2 the carboxylato ion, and, when R_2 represents carboxyl, their salts with non-toxic metals and addition salts with non-toxic nitrogen-containing bases.

5. A antibacterial pharmaceutical composition comprising a cephalosporin derivative as claimed in claim 1 or when R_2 is carboxy or a salt thereof with a pharmaceutically acceptable, non-toxic metal or with a pharmaceutically acceptable, non-toxic nitrogen-containing base, in association with a compatible pharmaceutically acceptable diluent or adjuvant.

4,088,762

6-(p-PIPERAZINO)-PHENYL-4,5-DIHYDRO-3(2H)PYRIDAZINONES

Mehmood Abdulhameed Hakim, and Peter Thomas Bysouth, both of Edinburgh, Scotland, assignors to BDH Pharmaceuticals Limited, Edinburgh, Scotland

Division of Ser. No. 522,538, Nov. 11, 1974, Pat. No. 3,975,388, which is a continuation of Ser. No. 225,270, Feb. 10, 1972, abandoned. This application Apr. 27, 1976, Ser. No. 680,843

Claims priority, application United Kingdom, Feb. 22, 1971, 5082/71

Int. Cl.[2] C07D *403/10;* A61K *31/50*

U.S. Cl. 424—250 **20 Claims**

1. A compound of the formula:

in which R represents hydrogen, lower alkyl of 1 to 5 carbon atoms, phenyl, mono substituted phenyl wherein the substituent is methyl, methoxy or ethoxy; benzyl, phenethyl, benzoyl or ethoxy-carbonyl.

2. A pharmaceutical composition consisting essentially of a compound as claimed in claim 1 in association with a pharmaceutically acceptable carrier or diluent.

5. A method of treating a patient suffering from or liable to hypertension which comprises administering to said patient an effective amount of a compound as claimed in claim 1.

4,088,763

ALKYLENEDIOXY PIPERAZINE DERIVATIVES

Richard Cyrus, Ludwigshafen, and Manfred Raschack, Weisenheim am Sand, both of Germany, assignors to Knoll A.G. Chemische Fabriken, Ludwigshafen (Rhine), Germany

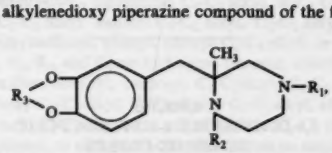
Filed Jan. 19, 1977, Ser. No. 760,557

Claims priority, application Germany, Feb. 7, 1976, 2604838

Int. Cl.[2] A61K *31/495;* C07D *241/04*

U.S. Cl. 424—250 **76 Claims**

1. An alkylenedioxy piperazine compound of the formula



or a salt thereof with a physiologically tolerable acid, wherein

R_1 is hydrogen, diphenylmethyl, or diphenylmethyl wherein one of the phenyl groups has a halogen substituent;

R_2 is hydrogen, hydrocarbon having 1–5 carbon atoms, or such hydrocarbon substituted by amino or hydroxy; and

R_3 is methylene or ethylene.

75. A pharmaceutical composition for the treatment of coronary cardiac diseases or vascular diseases such as peripheral and cerebral circulatory disturbances, which composition comprises a therapeutically effective amount of a compound or salt as in claim 1 in combination with a pharmaceutical carrier.

4,088,764

PHARMACEUTICALLY ACTIVE DERIVATIVES OF 1-PHENOXY-3-AMINO-PROPAN-2-OL

Thomas Raabe, Rodenbach; Otto Crawinger, Frankfurt am Main; Josef Scholtholt, Mittelbuchen; Rolf-Eberhard Nitz, Bergen-Enkheim, and Eckhard Schraven, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

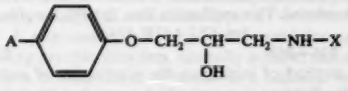
Filed Dec. 10, 1974, Ser. No. 531,344

Claims priority, application Luxembourg, Dec. 27, 1973, 34590

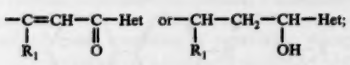
Int. Cl.[2] A61K *31/505;* C07D *239/26*

U.S. Cl. 424—251 **13 Claims**

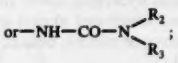
1. A compound of the formula



wherein X



A is $-CH_2$-alkoxy, -O-alkoxyalkyl, -O-hydroxyalkyl or



R_1 is -H or methyl;

Het

is pyrimidinyl which is optionally substituted by up to three methyl groups; and

each of

R_2 and R_3 is, independently, -H, alkyl, alkenyl or cycloalkyl; each alkyl having from 1 tp 4 carbon atoms, each alkoxy having from 1 to 4 carbon atoms, each alkenyl having 3 or 4 carbon atoms and each cycloalkyl having from 5 to 7 carbon atoms;

or a pharmaceutically-acceptable acid-addition salt thereof.

11. A pharmaceutically-acceptable β-adrenergic-blocking composition comprising diluent or excipient and an effective concentration of a compound according to claim 1.

4,088,765

5,6-DIMETHOXY-2-HETEROCYCLIC BENZIMIDAZOLES

Martin Winn, Deerfield, and Jaroslav Kyncl, Lake Bluff, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 2, 1976, Ser. No. 746,656

Int. Cl.[2] C07D *401/04;* A61K *31/47, 31/445*

U.S. Cl. 424—258 **9 Claims**

1. A compound selected from the group consisting of 5,6-dimethoxy-2-(4-benzyl-1-piperidino) benzimidazole and 5,6-dimethoxy-2(6,7-dimethoxy-1,2,3,4-tetrahydro 2-isoquinolinyl) benzimidazole and pharmaceutically acceptable acid addition salts thereof.

4. A pharamceutical composition comprising a therapeutically effective amount of a compound selected from the group consisting of 5,6-dimethoxy 2-(4-benzyl-1-piperidino) benzimidazole and 5,6-dimethoxy-2-(6,7-dimethoxy-1,2,3,4-tetrahydro 2-isoquinolinyl) benzimidazole and pharmaceutically acceptable acid addition salts thereof and a pharmaceutically acceptable carrier.

4,088,766

UREA CONTAINING COMPOSITIONS AND METHODS

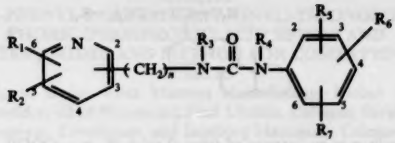
William A. Callahan, Richland Township, Kalamazoo County; Eldridge Myles Glenn, Kalamazoo, and Douglas L. Rector, Parchment, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 590,031, Jun. 25, 1975, Pat. No. 4,001,256, which is a continuation-in-part of Ser. No. 428,361, Dec. 26, 1973, abandoned. This application Dec. 2, 1976, Ser. No. 746,798

Int. Cl.[2] A61K *31/44*

U.S. Cl. 424—263 **57 Claims**

1. A method of increasing the production of endogenous prostaglandins by a mammal which comprises administering to said mammal an effective amount of a compound of formula:



pyridyl N-oxides thereof or the pharmaceutically acceptable acid addition salts thereof wherein

R_1 and R_2 are hydrogen, halogen, hydrocarbyl having 1 to 6 carbon atoms, inclusive, alkoxy, nitro, amino, alkylamino, dialkylamino, acylamino or trihalomethyl;

R_3 and R_4 are hydrogen, lower alkyl, cycloalkyl, aryl, aralkyl or aryl substituted with a group selected from halogen, lower alkoxy, nitro, aryloxy or hydrocarbyl; R_5 is hydrogen, halogen, hydrocarbyl, alkoxy or halogen-substituted hydrocarbyl; R_6 and R_7 are nitro, amino, acylamino, alkylamino, dialkylamino, aryloxy or a group R_5 as previously defined; and n is an integer of from 1 to 2, inclusive; provided that when one of R_5, R_6 and R_7 is chlorine the pyridine ring moiety of said compound is attached to the rest of the molecule through the pyridyl ring carbon atom at the 4-carbon position.

4,088,767

4-DICHLOROPHENYLURAZOLE COMPOUNDS AND USE IN AGRICULTURAL FUNGICIDAL COMPOSITIONS

Taichiro Shigematsu; Tetsuya Shibahara; Makoto Nakazawa, all of Yokohama; Masayuki Tomida, Sagamihara, and Toshio Munakata, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

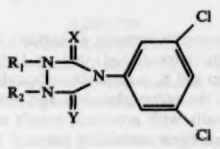
Filed Dec. 4, 1975, Ser. No. 637,740

Claims priority, application Japan, Dec. 6, 1974, 49-140224

Int. Cl.[2] A01N *9/12, 9/22, 21/00;* C07D *249/12*

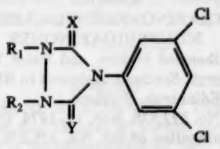
U.S. Cl. 424—269 **10 Claims**

1. A compound represented by the formula



wherein each of X and Y represents oxygen or sulfur; R_1 and R_2 may be the same or different and represent alkyl having 1 to 4 carbon atoms; allyl; phenyl which may have a substituent selected from the group consisting of halogen or methyl; alkylcarbonyl having 2 to 4 carbon atoms; alkylcarbamoyl having 2 to 4 carbon atoms; ethoxycarbonyl; methylthiocarbamoyl; and (ethylthio) thiocarbamoyl.

5. A composition which comprises a fungicidal amount of the compound represented by the formula



wherein X and Y represent oxygen or sulfur, R_1 and R_2 may be the same or different and represent alkyl having 1 to 4 carbon atoms; allyl; phenyl which may have a substituent selected from the group consisting of halogen or methyl; alkylcarbonyl having 2 to 4 carbon atoms, alkylcarbamoyl having 2 to 4

carbon atoms, ethoxycarbonyl, methylthiocarbamoyl, or (ethylthio) thiocarbamoyl, and an adjuvant.

4,088,768

N-HETEROCYCLIC UREAS AS IMMUNE REGULANTS

Charles J. Paget, Indianapolis, and John L. Sands, W. Lafayette, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 574,991, May 6, 1975, abandoned, which is a continuation of Ser. No. 185,823, Oct. 1, 1971, abandoned, which is a continuation-in-part of Ser. No. 794,756, Jan. 28, 1969, abandoned. This application Jan. 21, 1976, Ser. No. 651,322

Int. Cl.[2] A61K *31/425*

U.S. Cl. 424—270 1 Claim

1. The method for regulating the immune response which comprises administering to a mammal suffering from an immune reaction a dose of from 0.1 to 500 mg/kg of mammalian body weight of N-2-(6-methoxy)-benzothiazolyl-N′-phenyl urea.

4,088,769

METHOD OF INHIBITING HISTAMINE ACTIVITY WITH GUANIDINE COMPOUNDS

James Whyte Black, Hemel Hempstead; Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

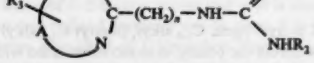
Division of Ser. No. 668,364, Mar. 19, 1976, which is a division of Ser. No. 526,767, Nov. 25, 1974, Pat. No. 3,968,216, which is a division of Ser. No. 310,302, Nov. 29, 1972, Pat. No. 3,868,457, which is a continuation-in-part of Ser. No. 80,795, Oct. 14, 1970, abandoned. This application May 9, 1977, Ser. No. 795,254

Claims priority, application United Kingdom, Oct. 29, 1969, 52891/69

Int. Cl.[2] A61K *31/415, 31/425*

U.S. Cl. 424—270 6 Claims

1. A method of inhibiting gastric acid secretion which comprises administering internally to an animal requiring inhibition of gastric acid secretion in an amount sufficient to inhibit gastric acid secretion a compound of the formula



in which:

n is 2 to 5;

A taken together with the carbon and nitrogen atoms to which it is attached forms a pyrazole or 2-thiazole ring;

R_1 is hydrogen, alkyl having 1 to 4 carbon atoms or benzyl;

R_2 is hydrogen, alkyl having 1 to 4 carbon atoms, benzyl, imidazolylethyl or amino or R_1 and R_2 together form an ethylene bridge and

R_3 is hydrogen, alkyl having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms or amino or a pharmaceutically acceptable acid addition salt thereof.

4,088,770

SUBSTITUTED 2-ANILINOBENZOXAZOLES USED AS IMMUNOSUPPRESSIVE AGENTS

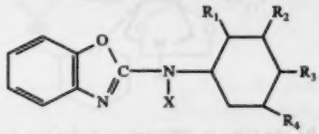
Charles J. Paget, Jr., Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 255,702, May 22, 1972, abandoned, which is a continuation-in-part of Ser. No. 188,544, Oct. 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 140,289, May 4, 1971, abandoned. This application Nov. 28, 1973, Ser. No. 419,733

Int. Cl.[2] A61K *31/42*

U.S. Cl. 424—272 6 Claims

1. The method of suppressing the immune response in a warm-blooded mammal comprising administering to said mammal an immune response suppressing amount of a compound of the formula:



wherein,

X is hydrogen, C_1-C_4 alkyl, C_1-C_3 alkoxy, C_1-C_3 alkoxy C_1-C_3 alkyl, carboxy, carboxy C_1-C_3 alkyl, amino C_1-C_3 alkyl, mono-C_1-C_3 alkylamino C_1-C_3 alkyl, di-C_1-C_3 alkylamino C_1-C_3 alkyl, anilino C_1-C_3 alkyl, C_1-C_3 alkylthio, C_1-C_3 alkylsulfonyl, phenyl, phenyl C_1-C_3 alkyl, or carbanilino;

R_1, R_2, R_3, and R_4 are hydrogen, bromine, chlorine, fluorine, trifluoromethyl, carboxy, C_1-C_3alkyl, C_1-C_3 alkoxy, carboxy C_1-C_3 alkyl, C_1-C_3 alkoxy C_1-C_3 alkyl, alkylcarbonyl, carb C_1-C_3 alkoxy, C_1-C_3 alkylthio, C_1-C_3 alkylsulfonyl, phenyl, or nitro, with the proviso that no more than one of R_1, R_2, R_3, and R_4 is nitro or phenyl, and no more than two of R_1, R_2, R_3 and R_4 are other than hydrogen.

4,088,771

1-LOWER ALKYL-4,5-DIHYDRO-5-PHENYL-2-LOWER ALKOXY CARBONYLAMINOIMIDAZOLES AND SUBSTITUTED PHENYL DERIVATIVES THEREOF

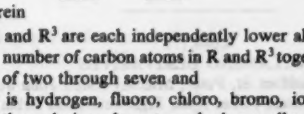
Adolph P. Roszkowski, Saratoga; Colin C. Beard; Charles Dvorak, both of Palo Alto, and Klaus Weinhardt, Redwood City, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 26, 1976, Ser. No. 708,651

Int. Cl.[2] A61K *31/415*

U.S. Cl. 424—273 R 57 Claims

1. A compound selected from those represented by the formula



wherein

R and R^3 are each independently lower alkyl and the total number of carbon atoms in R and R^3 together is an integer of two through seven and

X is hydrogen, fluoro, chloro, bromo, iodo, alkyl of one through six carbon atoms, hydroxy, alkoxy of one through six carbon atoms, or trifluoromethyl and the pharmaceutically acceptable salts thereof.

27. A pharmaceutical composition useful for palliating or inhibiting psychic disorders, centrally induced musculoskeletal disorders or convulsive disorders in a mammal which comprises an effective amount of the compound of claim 1 and a pharmaceutically acceptable carrier.

4,088,772

METHANODIBENZOCYCLOHEPTAPYRROLES

Engelbert Ciganek, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

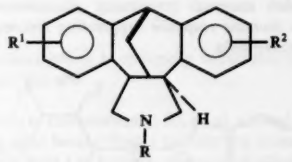
Continuation-in-part of Ser. No. 545,001, Jan. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 448,686, Mar. 6, 1974, abandoned. This application Mar. 3, 1976, Ser. No. 663,430

Claims priority, application Sweden, Feb. 11, 1975, 7501519

Int. Cl.[2] C07D *209/44;* **A61K** *31/40*

U.S. Cl. 424—274 **43 Claims**

1. A compound of the formula:



where

R^1 and R^2, the same or different = hydrogen, lower alkyl, lower alkoxy, hydroxyl, fluorine, chlorine, bromine, 2,2,2-trifluroethyl, carboxyl, methoxycarbonyl, ethoxycarbonyl, N-methylsulfamyl, lower alkylcarbonyl, cycloalkylcarbonyl of 4–7-carbons, nitro, amino, acetamido, formyl, cyano, azido, fluoromethyl, difluoromethyl, formyloxime, acetyloxime,

where R^6 is hydrogen, lower alkyl, or alkenyl of 3–4 carbons; provided, that only one of R^1 and R^2 is nitro;

R=hydrogen, alkyl of 1–10 carbons, alkenyl of 3–7 carbons attached by a saturated carbon to N, cycloalkyl of 3–5 carbons, propargyl, α-furylmethyl, α-tetrahydrofurylmethyl, α-thienylmethyl; and $-(CH_2)_nCN$, $-(CH_2)_n$-COOH, $-(CH_2)_qOR^3$, $-(CH_2)_nCOO$ (lower alkyl), and $-(CH(R^4)(CH_2)_pR^5$ of up to 14 carbons, where

n = 1–6;

p = 0–5;

q = 2–6;

R^3 = lower alkyl, phenyl, or lower alkylphenyl;

R^4 = hydrogen or n-lower alkyl;

R^5 = a hydrocarbyl group containing at least one ring of 3–9 carbons attached to alkylene by a ring carbon; provided, when p = O, the carbon attached to $-CH(R^4)-$ is not a quaternary carbon; and tertiary amine oxides when R is other than hydrogen.

27. A pharmaceutical composition comprising a suitable pharmaceuutical carrier and an effective tranquilizing amount of a compound of claim **3**.

34. A method of tranquilizing a mammal which comprises administering an effective tranquilizing dose of a compound of claim **3**.

4,088,773

ACYLAMINO DERIVATIVES

Delme Evans, Chalfont St. Peter; Michael Ralph John Jolley, Camberley; William James Ross, Lightwater, and Brian Picton Swann, Camberley, all of England, assignors to Lilly Industries Limited, London, England

Filed Jun. 1, 1976, Ser. No. 691,964

Claims priority, application United Kingdom, Jun. 5, 1975, 24223/75

Int. Cl.[2] C07D *207/34;* **A61K** *31/40*

U.S. Cl. 424—274 **24 Claims**

1. A pyrrole of the formula

wherein R is hydrogen, C_{1-6} alkyl, phenyl C_{1-4} alkyl, or phenyl C_{1-4} alkyl wherein the phenyl group is mono substituted with halogen, trifluoromethyl, methyl, methoxy, or nitro; R^1 is C_{1-10} alkyl, C_{1-6} alkenyl, C_{3-6} alkynyl, C_{2-6} alkoxyalkyl, C_{2-6} carboxyalkyl, C_{1-6} haloalkyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, or phenyl-C_{1-6} alkyl and phenyl-C_{2-6} alkenyl wherein the phenyl group is mono substituted with halogen, trifluoromethyl, methyl, methoxy and nitro; and R^2 is C_{1-8} alkyl, C_{1-6} haloalkyl, C_{2-6} alkenyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, phenyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, or phenyl, phenyl-C_{1-6} alkyl and phenyl-C_{2-6} alkenyl wherein the phenyl group is mono substituted with halogen, trifluoromethyl, methyl, methoxy, and nitro; and R^3 is hydrogen or C_{1-4} alkyl.

21. A pharmaceutical formulation useful for the treatment of asthma containing a chemotherapeutically-effective amount of a pyrrole of the formula

wherein R is hydrogen, C_{1-6} alkyl, phenyl C_{1-4} alkyl or phenyl C_{1-4} alkyl wherein the phenyl is mono substituted with halogen, trifluoromethyl, methyl, methoxy, and nitro; R^1 is C_{1-10} alkyl, C_{3-6} alkenyl, C_{3-6} alkynyl, C_{2-6} alkoxyalkyl, C_{2-6} carboxyalkyl, C_{1-6} haloalkyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, or phenyl-C_{1-6} alkyl and phenyl-C_{2-6} alkenyl wherein the phenyl group is mono substituted with halogen, trifluoromethyl, methyl, methoxy and nitro; R^2 is C_{1-8} alkyl, C_{1-6} haloalkyl, C_{2-6} alkenyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, phenyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, or phenyl, phenyl-C_{1-6} alkyl and phenyl-C_{2-6} alkenyl wherein the phenyl group is mono substituted with halogen, trifluoromethyl, methyl, methoxy and nitro; and R^3 is hydrogen or C_{1-4} alkyl, in association with a pharmaceutically-acceptable carrier therefor.

23. A method of treating an animal suffering from, or susceptible to, asthma which comprises administering to the animal a chemotherapeutically-effective amount of a pyrrole of the formula

wherein R is hydrogen, C_{1-6} alkyl, phenyl C_{1-4} alkyl or phenyl C_{1-4} alkyl wherein the phenyl is mono substituted with halogen, trifluoromethyl, methyl, methoxy, and nitro; R^1 is C_{1-10} alkyl, C_{3-6} alkenyl, C_{3-6} alkynyl, C_{2-6} alkoxyalkyl, C_{2-6} carboxyalkyl, C_{1-6} haloalkyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, or phenyl-C_{1-6} alkyl and phenyl-C_{2-6} alkenyl wherein the phenyl group is mono substituted with halogen, trifluoromethyl, methyl, methoxy, and nitro; R^2 is C_{1-8} alkyl, C_{1-6} haloalkyl, C_{2-6} alkenyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, phenyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, or phenyl, phenyl-C_{1-6} alkyl and phenyl-C_{2-6} alkenyl wherein the phenyl group is mono substituted with halogen, trifluoromethyl, methyl, methoxy and nitro; and R^3 is hydrogen or C_{1-4} alkyl.

4,088,774
2-PHENYL-3-(4-HYDROXYCOUMARIN-3-YL)PHTHALIMIDINE

Jean Baget, Sceaux, and Jean-Jacques Hucherot, Saint-Maur, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Jun. 23, 1977, Ser. No. 809,277
Claims priority, application France, Jun. 25, 1976, 76 19394
Int. Cl.[2] A61K *31/40;* **C07D** *405/04*
U.S. Cl. 424—274 **2 Claims**

1. 3-(4-Hydroxycoumarin-3-yl)-2-phenylisoindolin-1-one.

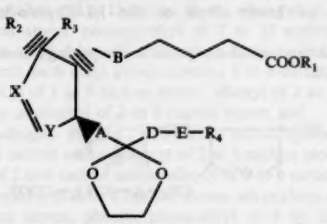
2. A pharmaceutical anticoagulant composition useful in human therapy which comprises an effective anticoagulant amount of 3-(4-hydroxycoumarin-3-yl)-2-phenylisoindolin-1-one as claimed in claim **1** in association with a compatible pharmaceutical carrier.

4,088,775
15-ETHYLENEDIOXY-PROSTANOIC ACID DERIVATIVES AND ESTERS THEREOF AND INTERMEDIATES THEREOF

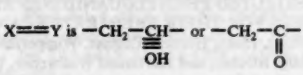
Werner Skuballa; Bernd Raduchel; Helmut Vorbruggen; Walter Elger; Wolfgang Losert, and Olaf Loge, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Jul. 11, 1975, Ser. No. 595,015
Claims priority, application Germany, Jul. 12, 1974, 2434133
Int. Cl.[2] A61K *31/335, 31/36;* **C07D** *317/00*
U.S. Cl. 424—278 **90 Claims**

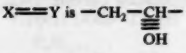
1. A prostanoic acid derivative of the formula



wherein R_1 is a hydrogen atom, alkyl of 1–10 carbon atoms, unsubstituted aryl, aryl substituted by 1–3 halogen atoms, one phenyl group, 1–3 alkyl groups of respectively 1–4 carbon atoms or one chloromethyl, fluoromethyl, trifluoromethyl, carboxyl or hydroxy group, or $—CH_2—U—V$ wherein U is a direct bond, carbonyl, or carbonyloxy and V is phenyl or phenyl substituted by at least one of phenyl, alkoxy of 1–2 carbon atoms or a halogen atom; one of R_2 and R_3 is hydroxy and the other is a hydrogen atom or R_2 and R_3 collectively are an oxygen atom; A is $—CH_2—CH_2—$ or a trans CH=CH; B is $—CH_2—CH_2—$ or cis—CH=CH; D and E collectively are a direct bond, or D is alkylene of 1–5 carbon atoms and E is an oxygen or sulfur atom; R_4 is benzodioxol-2-yl, aryl or arylalkyl wherein alkyl is of 1–5 carbon atoms and aryl is unsubstituted or substituted as defined hereinabove, or when E is an oxygen or sulfur atom, also alkyl of 1–10 carbon atoms;



when one of R_2 and R_3 is a hydroxy group and the other is a hydrogen atom or

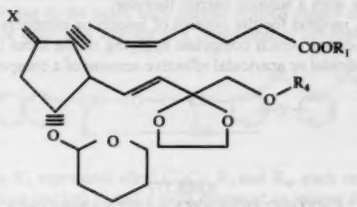


or —CH=CH when R_2 and R_3 collectively are an oxygen atom; and when R_1 is a hydrogen atom, the physiologically acceptable salts thereof with bases.

88. A pharmaceutical composition comprising in unit dosage form a compound of claim **1** in admixture with a pharmaceutically acceptable carrier.

89. A method of synchronization of the sexual cycle in female mammals which comprises administering to a fertile female mammal an amount of a compound of claim **1** in doses of 0.1 – 2 mg. effective to effect the synchronization of her sexual cycle.

90. A compound of the formula



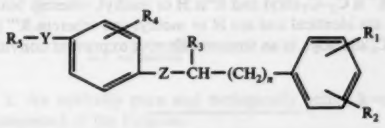
wherein X is =O or HOH, R_1 is a hydrogen atom, alkyl of 1–10 carbon atoms, unsubstituted aryl, aryl substituted by 1–3 halogen atoms, one phenyl group, 1–3 alkyl groups of respectively 1–4 carbon atoms or one chloromethyl, fluoromethyl, trifluoromethyl, carboxyl or hydroxy group, or $—CH_2—U—V$ wherein U is a direct bond, carbonyl, or carbonyloxy and V is phenyl substituted by at least one of phenyl, alkoxy of 1–2 carbon atoms or a halogen atom and R_4 is alkyl of 1–10 carbon atoms, alkyl of 1–5 carbon atoms substituted by unsubstituted aryl or by aryl substituted by 1–3 halogen atoms, one phenyl group, 1–3 alkyl groups of respectively 1–4 carbon atoms or one chloromethyl, fluoromethyl, trifluoromethyl, carboxyl or hydroxy group, unsubstituted or substituted aryl or benzodioxol-2-yl.

4,088,776
METHYLENE DIOXY-SUBSTITUTED BENZENE DERIVATIVES

Friedrich Karrer, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 460,403, Apr. 12, 1974, Pat. No. 3,987,108.
This application Oct. 4, 1976, Ser. No. 729,054
Claims priority, application Switzerland, Apr. 18, 1973, 5636/73; Mar. 18, 1974, 3706/74
Int. Cl.[2] A01N *9/28*
U.S. Cl. 424—282 **10 Claims**

1. A compound of the formula



(I)

wherein

n represents the number 0 or 1,

Y represents $—CH_2—$, $—CH_2O—$,

or the direct bond,

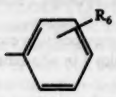
Z represents oxygen or sulphur,

R_1 and R_2 together represent a 3,4-methylenedioxy group,

R_3 represents hydrogen or C_1–C_3-alkyl,

R_4 represents hydrogen, C_1–C_3-alkyl or halogen,

R_5 represents cyclohexyl or the group



and

R_6 represents hydrogen, methyl, ethyl, halogen, methoxy or ethoxy.

9. An insecticidal or acaricidal agent containing an insecticidal or acaricidal effective amount of a compound of claim 1 together with a suitable carrier therefor.

10. A method for the control of insects or members of the order Acarina which comprises applying to the locus thereof an insecticidal or acaricidal effective amount of a compound of claim 1.

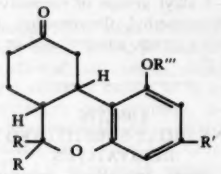
4,088,777

HEXAHYDRO-DIBENZO[B,d]PYRAN-9-ONES AS ANTICONVULSANT DRUGS

Robert A. Archer, and Louis Lemberger, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 17, 1976, Ser. No. 658,440
Int. Cl.[2] A01N *9/28;* A61K *31/35*
U.S. Cl. 424—283 7 Claims

1. A process for providing an anticonvulsant action in mammals which comprises administering to a mammal in need of treatment for convulsions an anticonvulsant dose of a compound represented by the formula



wherein R′ is either C_7–C_{10} normal alkyl or is the group

wherein R″ is C_2–C_7 alkyl and R′ is H or methyl, wherein both R groups are identical and are H or methyl and wherein R‴ is H or C_1–C_4 alkanoyl, in an amount effective to prevent convulsions.

4,088,778

METHOD FOR THE TREATMENT OF HYPERTENSION

Toshiji Igarashi, Tokorozawa, and Shinzaburo Ohtake, Tokyo, both of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1976, Ser. No. 671,931
Claims priority, application Japan, Apr. 2, 1975, 50-39206
Int. Cl.[2] A61K *31/355*
U.S. Cl. 424—284 5 Claims

1. A method of treating hypertension which comprises orally or parenterally administering to a hypertensive subject requiring such treatment, a therapeutically effective amount of d*l*-α-tocopheryl nicotinate, in combination with a pharmceutically acceptable carrier.

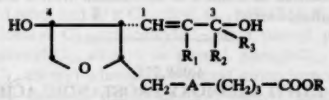
4,088,779

9-OXAPROSTAGLANDINS

Isidoros Vlattas, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

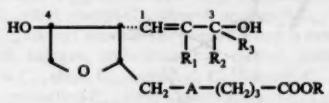
Continuation-in-part of Ser. No. 621,904, Oct. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 516,294, Oct. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 361,694, May 18, 1973, Pat. No. 3,883,659. This application Oct. 4, 1976, Ser. No. 729,572
Int. Cl.[2] C07D *307/16;* A61K *31/34*
U.S. Cl. 424—285 8 Claims

1. A 7-[3α-hydroxy-(3-hydrocarbylpropyl or -1-propenyl)-4-hydroxy-tetrahydro-2β-furyl]-heptanoic or 5-heptenoic acid of the formula



wherein each of R and R_3 is lower alkyl, lower alkenyl, lower alkynyl, (3 to 7 ring-membered cycloalkyl or cycloalkenyl)-C_mH_{2m} wherein *m* is an integer from 0 to 4, (Ph, PhO or Hc)-C_nH_{2n} wherein Ph is phenyl, (lower alkyl)-phenyl, (lower alkoxy)-phenyl, (lower alkylenedioxy)-phenyl, (halogeno)-phenyl, (trifluoromethyl)-phenyl,(nitro)-phenyl or (di-lower alkylamino)-phenyl, Hc is furyl or thienyl and *n* is an integer from 1 to 4, R is also hydrogen, an alkali metal or one equivalent of an alkaline earth metal and R_3 is also (lower alkoxy or halo)-lower alkyl, A is ethylene or ethenylene, R_1 and R_2 are hydrogen or lower alkyl, or the 1,2-dihydro-derivatives thereof.

7. A pharmaceutical composition comprising a compound of the formula



wherein R is hydrogen, an alkali metal or one equivalent of an alkaline earth metal, or lower alkyl, lower alkenyl, lower alkynyl, (3 to 7 ring-membered cycloalkyl or cycloalkenyl-)—C_mH_{2m} wherein *m* is an integer from 0 to 4, (Ph, PhO or Hc)—C_nH_{2n}, wherein Ph is phenyl, (lower alkyl)-phenyl, (lower alkoxy)-phenyl, (lower alkylenedioxy)-phenyl, (halogeno)-phenyl, (trifluoromethyl)-phenyl, (nitro)-phenyl or (di-lower alkylamino)-phenyl, Hc is furyl or thienyl and *n* is an integer from 1 to 4, A is ethylene or ethenylene, R_1 and R_2 are hydrogen or lower alkyl, and R_3 is (PhO or Hc)-C_nH_{2n}, or the 1,2-dihydro-derivatives thereof, in an amount sufficient for producing a prostaglandin-like effect, together with a pharmaceutical excipient.

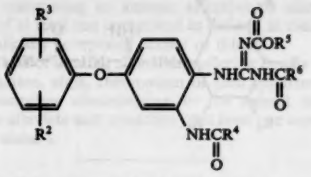
4,088,780

SUBSTITUTED PHENYLGUANIDINES AND PROCESSES FOR THEIR PREPARATION AND USE

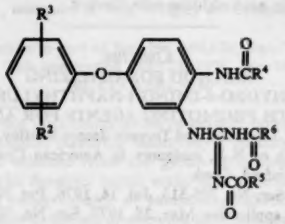
Heinrich Kölling, Haan; Herbert Thomas, Wuppertal-Elberfeld; Arno Widdig, Blecher, and Hartmund Wollweber, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 572,224, Apr. 28, 1975, Pat. No. 3,993,682. This application May 26, 1976, Ser. No. 690,073
Claims priority, application Germany, May 15, 1974, 2423679
Int. Cl.[2] C07C *129/12*
U.S. Cl. 424—300 20 Claims

1. A member selected from the group consisting of an N-(4-phenoxy-2-amidophenyl)guanidine compound of the formula:



and an N-(5-phenoxy-2-amidophenyl)guanidine of the formula:



wherein

R^4 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 4 carbon atoms, alkynyl of 2 to 4 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkoxy of 1 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, amino, alkylamino of 1 to 6 carbon atoms or dialkylamino wherein each alkyl group contains 1 to 6 carbon atoms;

R^5 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or alkynyl of 2 to 6 carbon atoms; and

R^6 is hydrogen, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkenyloxy of 2 to 6 carbon atoms, alkynyloxy of 2 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms or alkoxyalkoxy of 2 to 12 carbon atoms;

each of R^2 and R^3 independent of the other is hydrogen, halogeno, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms, trifluoromethyl, alkanoyl of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms, or carbalkoxy of 2 to 7 carbon atoms.

4,088,781

SULPHONIUM COMPOUNDS AND THEIR APPLICATION

Pierre Tozzolino, Bizanos, France, assignor to Societe Nationale Elf Aquitaine (Prod.), Courbevoie, France

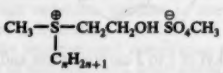
Filed Jul. 6, 1976, Ser. No. 702,582

Claims priority, application France, Jul. 11, 1975, 75 21826

Int. Cl.² A61K *31/255;* **C07C** *141/04*

U.S. Cl. 424—303 **8 Claims**

1. A dialkyl 2-hydroxyethyl sulfonium metho-sulfate having fungicidal properties of the formula



wherein *n* is 8, 9 or 10.

4,088,782

SUBSTITUTED-BENZYL α-C_1-C_4 ALKYL-2-NAPHTHALENEACETATES AS INSECTICIDAL AGENTS

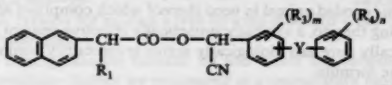
Venkataraman Kameswaran, Pennbrook, Pa., and Roger William Addor, Pennington, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 673,244, Apr. 2, 1976, Pat. No. 4,046,799. This application Jan. 4, 1977, Ser. No. 756,658

Int. Cl.² A01N *9/06, 9/20*

U.S. Cl. 424—304 **12 Claims**

1. A method for the control of insects and acarids comprising applying to the pests, their habitat or food supply an insecticidal or acaricidal amount of a compound of the formula:



wherein R_1 represents alkyl C_1-C_4; R_3 and R_4, each represent halogen or methyl; *m* and *n* each represent an integer 0, 1 or 2 and Y represents O, S or CH_2.

4,088,783

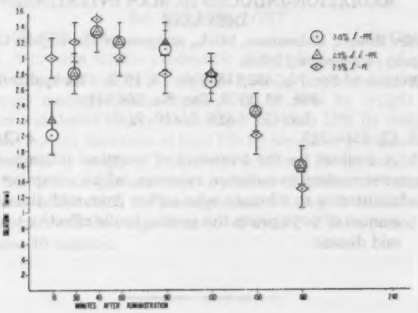
NOVEL OPTICALLY ACTIVE M-ACYLOCY-α-[(METHYLAMINO)METHYL]BENZYL ALCOHOLS AND THE PHARMACEUTICALLY ACCEPTABLE ACID ADDITION SALTS THEREOF

Nicolae S. Bodor, and Sun-Shine Yuan, both of Lawrence, Kans., assignors to INTERx Research Corporation, Lawrence, Kans.

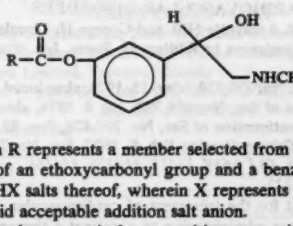
Division of Ser. No. 578,079, May 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 548,606, Feb. 10, 1975, Pat. No. 3,966,749. This application Oct. 18, 1976, Ser. No. 732,978

Int. Cl.² A61K *31/225;* **C07C** *91/34*

U.S. Cl. 424—313 **15 Claims**



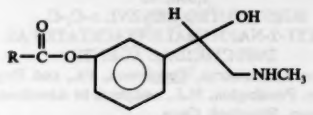
1. An optically pure and biologically active levorotatory compound of the formula:



(I)

wherein R represents a member selected from the group consisting of an ethoxycarbonyl group and a benzyloxycarbonyl or the HX salts thereof, wherein X represents a pharmaceutically acid acceptable addition salt anion.

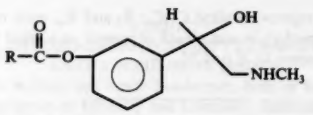
2. A pharmaceutical composition comprising a sympathomimetically effective amount of an optically pure and biologically active levorotatory compound of the formula:



(I)

wherein R represents a member selected from the group consisting of an ethoxycarbonyl group and a benzyloxycarbonyl group, or the HX salts thereof, wherein X represents a pharmaceutically acceptable acid addition salt anion in combination with a non-toxic organic or inorganic pharmaceutically acceptable carrier.

8. A method for inducing a sympathomimetic response in a warm-blooded animal in need thereof which comprises administering thereto, a sympathomimetically effective amount of an optically pure and biologically active levorotatory compound of the formula:



(I)

wherein R represents a member selected from the group consisting of an ethoxycarbonyl group and a benzyloxycarbonyl group, of from 1 to 20 carbon atoms or the HX salts thereof, wherein X represents a pharmaceutically acceptable acid addition salt anion.

4,088,784

CYTOPROTECTIVE PROSTAGLANDINS FOR USE IN RADIATION-INDUCED HUMAN INTESTINAL DISEASES

André Robert, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 658,148, Feb. 17, 1976. This application Jun. 13, 1977, Ser. No. 806,041

Int. Cl.[2] A61K *31/19, 31/215*

U.S. Cl. 424—317 **4 Claims**

1. A method for the treatment of intestinal inflammatory disease secondary to radiation exposure, which comprises:

administering to a human who suffers from said disease an amount of a cytoprotective prostaglandin effective to cure said disease.

4,088,785

AMIDINOUREAS FOR THE TREATMENT OF CARDIOVASCULAR DISORDERS

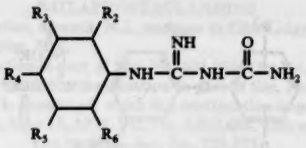
Julius Diamond, Lafayette Hill, and George H. Douglas, Paoli, both of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Division of Ser. No. 670,220, Mar. 25, 1976, abandoned, which is a continuation of Ser. No. 486,783, Jul. 9, 1974, abandoned, which is a continuation of Ser. No. 291,474, Sep. 22, 1972, abandoned. This application Feb. 8, 1977, Ser. No. 766,656

Int. Cl.[2] A61K *31/17, 31/275, 31/165*

U.S. Cl. 424—322 **6 Claims**

1. A method for the treatment of cardiovascular disorders which comprises administering to a patient a therapeutically effective amount of at least one of the compounds of the formula:



where:

R_2, R_3, R_4, R_5 and R_6 may be the same or different and are hydrogen provided at least one of R_2, R_3, R_4, R_5 and R_6 is other than hydrogen. halo, halologweralkyl, nitro, cyano, loweralkylsulfonyl, loweralkoxy or loweralkyl; and

the non-toxic acid addition salts thereof.

4,088,786

METHOD FOR UTILIZING TETRAHYDRO-4-IMINO-1-NAPHTHYLUREAS AS GROWTH PROMOTING AGENTS FOR ANIMALS

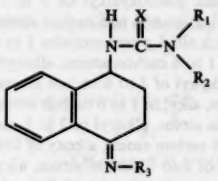
Goro Asato, Titusville, and Terence James Bentley, South Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 705,313, Jul. 14, 1976, Pat. No. 4,041,070. This application Mar. 25, 1977, Ser. No. 781,231

Int. Cl.[2] A61K *31/17*

U.S. Cl. 424—322 **5 Claims**

1. A method for enhancing the growth rate of veterinary homothermic animals comprising administering to said animals an effective amount of a compound represented by the formula:



wherein X is oxygen or sulfur; R_1 is hydrogen or alkyl C_1–C_4; R_2 is hydrogen, alkyl C_1–C_4, 2-propynyl, alkoxy C_1–C_4 or benzyloxy; R_3 is a radical selected from the group consisting of —OR_4, and —$N(CH_3)_2$; R_4 is hydrogen, alkyl C_1–C_4 or benzyl; R_5 is alkyl C_1–C_4; the racemic mixtures or the optical isomers thereof.

4,088,787

INDANE ETHANOLS

Jean-Marie Teulon, La Celle Saint-Cloud, France, assignor to Societe Hexachimie, Rueil-Malmaison, France

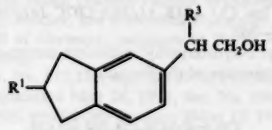
Division of Ser. No. 546,095, Jan. 31, 1975. This application May 27, 1976, Ser. No. 690,390

Claims priority, application United Kingdom, Feb. 7, 1974, 5726/74; Aug. 23, 1974, 37220/74; Dec. 16, 1974, 54292/74

Int. Cl.[2] C07C *35/32;* **C01B** *33/08*

U.S. Cl. 424—343 **7 Claims**

1. A compound of the formula



wherein R^1 is alkyl of 1 to 3 carbon atoms and R^3 is a hydrogen atom or methyl.

6. A composition for the treatment of an animal suffering

from a condition of inflammation, algia, rheumatism or pain syndrome comprising an amount effective to alleviate said condition of at least one compound as defined in claim 1 and a pharmaceutically acceptable carrier or diluent.

7. A method of treating an animal suffering from a condition of inflammation, algia, rheumatism or pain syndrome, which method comprises administering to the animal an amount effective to alleviate said condition of at least one compound as defined in claim 1.

4,088,788

SALIVA STIMULATING CHEWING GUM COMPOSITION

Ronald L. Ream, North Aurora, and David M. Moore, Lombard, both of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Continuation-in-part of Ser. No. 694,024, Jun. 7, 1976, abandoned. This application Dec. 23, 1976, Ser. No. 753,841

Int. Cl.[2] A23G *3/30*

U.S. Cl. 426—3 7 Claims

1. A chewing gum composition essentially comprising gum base; a sweetener; flavoring additives; a palatable and safe organic acid selected from the group consisting of adipic, ascorbic, citric, fumaric, lactic, malic and tartaric acids, said organic acid being capable of stimulating salivation beyond that attributable to the act of chewing food and constituting at least 3 percent by weight of the final gum composition; and saccharin from 0.01% to 0.3% by weight of the final gum composition.

4,088,789

ENSILAGING AGENT FOR FODDER PLANTS

Theodor Beck, Munich, and Friedrich Gross, Brub near Munich, both of Germany, assignors to Plate Bonn Gesellshaft mit Beschrankter Haftung, Bonn, Germany

Continuation-in-part of Ser. No. 486,166, Jul. 5, 1974, abandoned. This application Apr. 14, 1976, Ser. No. 676,865

Claims priority, application Germany, Jul. 11, 1973, 2335253

Int. Cl.[2] A23K *3/03*

U.S. Cl. 426—9 10 Claims

1. An ensilaging agent for fodder comprising from about 0.75 to 1 part by weight of an alkali metal salt of nitrous acid, from about 0.3 to 0.8 parts by weight of a compound yielding an aliphatic aldehyde having 1 to 6 carbon atoms, and from about 0.15 to 1.5 parts by weight benzoic acid or a salt thereof for each 1 part by weight of combined nitrous acid salt and aldehyde-yielding compound.

4,088,790

REDUCING RECONSTITUTION TIME OF DEHYDRATED VEGETABLES WITH PHYTATE

David William Bevan, Renhold; Michael Willam Clarke, Wellingborough; Derek Robin Haisman, Ravensden, and Sydney Pendlington, Bromham, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 540,049, Jan. 10, 1975, abandoned, which is a division of Ser. No. 410,068, Oct. 24, 1973, abandoned, which is a continuation of Ser. No. 117,075, Feb. 19, 1971, abandoned. This application Apr. 26, 1976, Ser. No. 680,329

Claims priority, application United Kingdom, Mar. 10, 1970, 11413/70; Mar. 10, 1970, 11414/70

Int. Cl.[2] A23L *1/20*

U.S. Cl. 426—96 8 Claims

1. In the process of preparing a dehydrated vegetable product, intended for reconstitution in boiling water by the consumer, said process including the conventional steps of initially blanching the fresh vegetable product to prevent subsequent discoloration, and dehydrating said blanched vegetable product by drying, the improvement comprising reducing the reconstitution time of said blanched, dehydrated vegetable product by contacting the vegetable product with a water-soluble phytate, under such conditions that the blanched, vegetable product is provided with 0.005 mole to 0.02 mole of added water-soluble phytate per kg of vegetable solids, expressed on a dry weight basis.

4,088,791

FREE FLOWING MODIFIED WHEY POWDER

Robert E. Jones, Oakland, Calif., assignor to Marvin F. Beach, Redondo Beach, Calif.

Filed Mar. 1, 1976, Ser. No. 662,464

Int. Cl.[2] A23C *21/00*

U.S. Cl. 426—99 26 Claims

1. A process for making a free flowing modified whey powder comprising:

(a) mixing titanium dioxide, fat and water and forming an emulsion thereof by processing at a temperature range of 32° F to 200° F for a time period between 16 seconds and 3 hours;

(b) adding said mixture to concentrated whey and

(c) spray drying the same;

and wherein the level of titanium dioxide in the final dried product falls within 0.5 and 20% and the fat level falls between 0.5 and 70%.

4,088,792

LOW CALORIE DESSERT

Umberto Bracco, La Tour-de-Peilz, Switzerland, assignor to Societe d'Assistance Technique pour Produits Nestle SA (Nestec), La Tour-de-Peilz, Switzerland

Filed Aug. 21, 1975, Ser. No. 606,429

Claims priority, application Switzerland, Sep. 6, 1974, 12126/74

Int. Cl.[2] A23L *1/187*

U.S. Cl. 426—250 20 Claims

1. A process for the production of an edible cream of low calorie content and a viscosity of 1.6 to 2.1 poises, wherein an aqueous medium containing from 50 to 90% by weight of water and, based on dry materials, from 10 to 35% by weight of amylaceous materials, at least 5% by weight of proteins and at least 5% by weight of fats, of which at least 1% are emulsifying fats, is homogenized under a pressure of at least 100 atmospheres, after which the homogenisate obtained is heated at a temperature in the range from 80° C to 130° C for a period of at least 10 minutes.

4,088,793

CONTROL OF NITROSAMINE FORMATION IN NITRITE CURED MEAT

Kekhusroo R. Bharucha; Leon J. Rubin, both of Toronto, and Charles K. Cross, Rexdale, all of Canada, assignors to Canada Packers Limited, Toronto, Canada

Filed Jan. 26, 1977, Ser. No. 762,745

Int. Cl.[2] A23B *4/02*

U.S. Cl. 426—266 23 Claims

1. A meat treating composition comprising a solution or dispersion of a nitroxide derivative of a 1,2-dihydro- or 1,2,3,4-tetrahydro-6 -alkoxyquinoline compound, in a nitrite-containing meat curing solution, the amount of said compound in said composition being effective to reduce the formation of nitrosamines in nitrite cured meat treated by said composition and cooked at frying temperature.

4,088,794

PROCESS FOR PRODUCING COFFEE EXTRACT

Saul N. Katz, Monsey, N.Y.; Martin Gottesman, Paramus, N.J., and Mateo Haya, New York, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 404,948, Oct. 10, 1973, abandoned.
This application May 27, 1977, Ser. No. 801,135
Int. Cl.[2] A23F *1/08*
U.S. Cl. 426—434 9 Claims

1. In a process for producing coffee extract wherein progressively less extracted roasted and ground coffee is countercurrently contacted with an aqueous extraction liquid in the extraction columns of a percolator set, and wherein said aqueous extraction liquid is fed to the spent stage extraction column containing the most extracted coffee in the set and is drawn off as coffee extract from the fresh stage extraction column containing the least extracted roasted and ground coffee in the set, the improvement comprising utilizing a superficial velocity of aqueous extraction past the roasted and ground coffee of at least about 0.50 ft/min in less than all the extraction columns but including said fresh stage extraction column.

4,088,795

LOW CARBOHYDRATE OILSEED LIPID-PROTEIN COMESTIBLE

Kenneth C. Goodnight, Jr., and Grant H. Hartman, Jr., both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Filed Nov. 19, 1976, Ser. No. 743,246
Int. Cl.[2] A23C *11/00;* A23J *3/00;* A23L *1/20*
U.S. Cl. 426—598 33 Claims

1. The process for preparing an oilseed lipid-protein comestible which comprises:

(a) forming an aqueous suspension of edible oilseed containing suspended oilseed lipid, dissolved oilseed protein, and dissolved oilseed carbohydrate at a pH in excess of the isoelectric range of said protein, said suspension being obtained by aqueous extraction of particulate oilseed material containing lipid, protein, and carbohydrate at a pH in excess of the isoelectric range of said protein;

(b) separating particulate material from said suspension to yield an emulsion containing suspended lipid, dissolved protein, and dissolved carbohydrate; and

(c) separating carbohydrate from said emulsion by filtration employing a semi-permeable membrane which has the capability to retain suspended lipid and dissolved protein as retentate, and to pass dissolved carbohydrate as permeate.

4,088,796

METHOD FOR MAKING ANIMAL FEED FROM MANURE

Per Oskar Persson, Helsingborg, Sweden, assignor to Ingenjörsfirman Per Oskar Persson AB, Helsingborg, Sweden

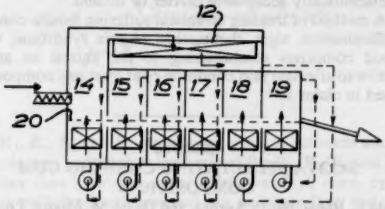
Continuation of Ser. No. 540,064, Jan. 10, 1975, abandoned, which is a continuation of Ser. No. 352,390, Apr. 18, 1973, abandoned. This application May 19, 1976, Ser. No. 687,967
Claims priority, application Sweden, Apr. 19, 1972, 725068
Int. Cl.[2] A23K *1/00*
U.S. Cl. 426—641 9 Claims

1. A method of drying manure from domestic animals to form an edible product, said method comprising:

(a) forming said manure into particles of substantially equal size, said manure having a solids content of about 50 weight percent expressed on a dry basis;

(b) passing said particles in a continuous movement from one end to the other of a drying space comprised of multiple stages;

(c) circulating a flowing, hot gas in a substantially closed space in a direction countercurrent to the movement of said particles in order to dry said particles, said gas being permitted to flow past said particles in an upwardly direction in each of said stages; and



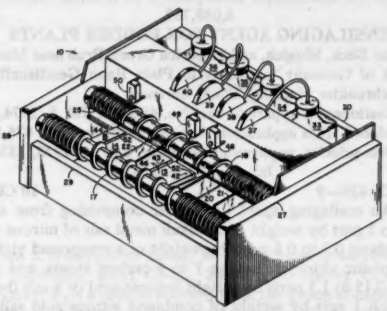
(d) heating said gas between said multiple stages, said drying of said manure taking place without contact of the manure with flue gases.

4,088,797

PROCESS FOR EVENLY APPLYING LIQUID TO A SURFACE

Leighton C. Johnson, Edwardsburg, Mich., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Division of Ser. No. 730,864, Oct. 8, 1976. This application Aug. 22, 1977, Ser. No. 826,392
Int. Cl.[2] B05D *1/00*
U.S. Cl. 427—2 4 Claims



1. The method for treating a flat-surfaced object by effecting contact between the surface of said object and a liquid at a liquid-applying station incident to the staining of material on said surface which comprises conveying the object along a predetermined path over a substantially flat liquid-applying surface, injecting treating liquid into the space between the object and the flat liquid-applying surface at a time when the object is over a liquid-applying station, temporarily interrupting the advance of the object while the latter is in position over the liquid-applying station and resuming the advance of the object after a predetermined time period following the application of liquid.

4,088,798

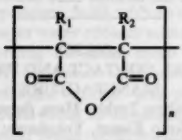
METHODS FOR THE PREPARATION OF CONTROLLED GASTRIC RESIDENCE TIME MEDICAMENT FORMULATIONS

Arthur F. Michaelis, Basking Ridge, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation of Ser. No. 630,901, Nov. 11, 1975, abandoned. This application Nov. 23, 1976, Ser. No. 744,255
Int. Cl.[2] A61K *9/00*
U.S. Cl. 427—3 8 Claims

8. A method of preparing a controlled gastric residence medicament formulation comprising:

a. applying a first coating to a medicament core of a non-toxic, water hydratable and water permeable, copolymer film, said copolymeric film comprising a ratio of eight parts of a first prepolymer of the formula:



(wherein

R_1, R_2, and n are as defined in claim 1 and a second prepolymer selected from the group consisting of alkenes having 2 to 6 carbon atoms, alkylvinylether, wherein the alkyl radical has from 1 to 12 carbon atoms and styrene; said first prepolymer cross-linked with from about 0.15 to 2 parts of a cross-linking agent selected from the group consisting of alkylene diol, polyalkylene glycols, polyoxyethylene sorbitan ethers, diamines, and triols, about 1 to 10 parts of plasticizer selected from the group consisting of glycerol triacetate, ethylacetate, diethyl phthalate, dibutyl phthalate, di(n-butyl) sebecate, propylene glycol, polyethylene glycol, glycerin, sorbitol, and mixtures thereof;)

b. treating the copolymeric film coated core with a volatile amine vapor for about 5 minutes to about 24 hours;

c. coating the amine treated copolymeric film core with a second coating of polymeric film of step (a); and

d. maintaining the coated medicament formulation at a relative humidity of 30 to 95 percent at a temperature of 10° to 90° C., for 4 to 200 hours to crosslink said second coating.

4,088,799

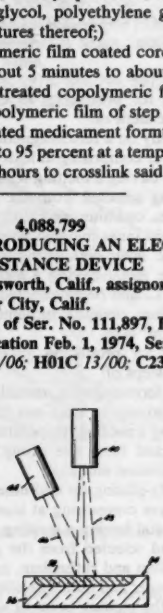
METHOD OF PRODUCING AN ELECTRICAL RESISTANCE DEVICE

Stephen L. Kurtin, Chatsworth, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 111,897, Feb. 2, 1971, abandoned. This application Feb. 1, 1974, Ser. No. 438,898

Int. Cl.[2] B05D *3/06;* **H01C** *13/00;* **C23C** *17/00*

U.S. Cl. 427—38 **3 Claims**



1. The process of producing an electrical resistance device having a selected thermal coefficient of resistance comprising the steps of:

bombarding at selected implantation parameters an inorganic electrical insulator body having an initial resistance of at least 10^9 ohm centimeters with a stream of metal ions with sufficient energy to implant at least some of the ions beneath the surface of the insulator body, for a sufficient length of time to implant at least 10^{15} ions per square centimeter to reduce the electrical resistance of the implanted portion of the insulator body to below 10^{10} ohms per square;

simultaneously discharging the ion current from the surface of the body where the ion stream impinges upon the body by coating a substantially ion permeable electrically conductive coating on the surface of the body upon which the ion beam impinges, and electrically connecting the conductive coating to discharge the ion current; and

terminating bombardment when the total number of implanted selected metal ions per unit area substantially reaches a selected value corresponding to a selected thermal coefficient of resistance as a result of the selected implantation parameters.

4,088,800

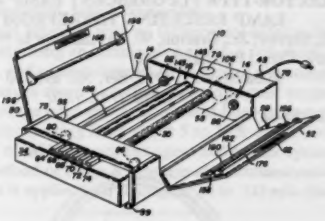
METHOD FOR CLEANING AND RE-INKING PRINTER RIBBONS

Albert N. Nicholson, San Jose, Calif., assignor to Computer Ribbon Systems, Inc., Santa Clara, Calif.

Continuation-in-part of Ser. No. 648,182, Jan. 12, 1976, abandoned. This application Apr. 13, 1976, Ser. No. 676,504

Int. Cl.[2] B41J *31/14*

U.S. Cl. 427—8 **6 Claims**



1. A method for cleaning and re-inking a printer ribbon carried on first and second reels comprising:

providing first and second pairs of spindles for rotatably carrying the first and second reels, respectively;

rotating the first pair of spindles such that the ribbon is cause to be accumulated on the first reel;

providing a rotating brush having a length at least as wide as the ribbon width;

passing the ribbon across the brush in a direction opposite to its rotation so that the brush engages the ribbon and removes foreign matter therefrom;

providing a sensing means capable of sensing holes in the ribbon, and sensing means including

a source of light positioned adjacent the path of one surface of the moving ribbon such that a beam of light from the source is directed against said one surface, and

a light detector positioned adjacent the opposite surface of the moving ribbon so that any holes in the ribbon allow light from the source to reach said detector; passing the brushed ribbon across the sensing means;

stopping the rotation of said spindles when the light detector senses light passing through a hole in the ribbon;

providing an inking roller having ink thereon;

passing the brushed ribbon in contact with said inking roller if no holes are detected so that ink is transferred from said inking roller to said ribbon; and

rotating said second pair of spindles so that the inked ribbon is wound about said second reel.

4,088,801

U.V. RADIATION CURABLE ELECTRICALLY CONDUCTIVE INK AND CIRCUIT BOARDS MADE THEREWITH

Donald A. Bolon, Scotia; Gary M. Lucas, and Siegfried H. Schroeter, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.J.

Filed Apr. 29, 1976, Ser. No. 681,591

Int. Cl.[2] B05D *5/06;* **H01B** *1/02*

U.S. Cl. 427—54 **10 Claims**

1. A method for making a circuit board which comprises,

(1) printing a UV radiation curable ink onto a nonconductive substrate to a desired circuit pattern, and

(2) effecting the radiation cure of the radiation curable ink at ambient temperatures, where said radiation curable ink comprises by volume,

(A) from about 10% to 60% of an organic resin binder having a viscosity of from about 50–10,000 centipoises at 25° C and 0.01% to 10% of a salt of silver or mercury free of halide ions having a water solubility of at least 1×10^{-5} g/l at 25° C and

(B) from about 90% to 40% of a particulated electrically conductive metal containing material having from about 0 to about 15% by weight of metal flake based on the weight of particulated electrically conductive metal containing material.

4,088,802

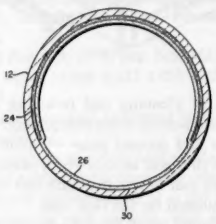
PROCESS FOR COATING ENVELOPE FOR REFLECTOR-TYPE FLUORESCENT LAMP AND THE LAMP RESULTING THEREFROM

Lloyd L. Shriver, Jr., Grafton, W. Va., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 27, 1976, Ser. No. 690,753

Int. Cl.² H01J *1/62, 1/70*

U.S. Cl. 427—67 **5 Claims**



1. The method of coating the elongated envelope of a reflector-type fluorescent lamp while using only one lehring operation to remove binder in one step from the coated reflective material and coated phosphor material, the reflector comprising finely divided white-appearing material coated onto and extending radially around only a predetermined proportion of the interior circumferential surface of said envelope to leave a reflective-material-uncoated longitudinal aperture through which the generated light may pass, and light-generating finely divided phosphor coated over both the reflective material coating and the remaining longitudinal aperture, which method comprises:

(a) flowing over only a predetermined proportion of the interior circumferential surface of an elongated fluorescent tube, a reflective material coating paint slurry comprising a mixture of finely divided titania and phosphor in the relative weight proportions of about 25 to 50% titania and about 75 to 50% phosphor both suspended in organic solvent having dissolved therein binder material which is insoluble in water to provide the slurry with a predetermined viscosity to deposit a predetermined weight of reflective material slurry onto said envelope;

(b) evaporating organic vehicle from the applied reflective material coating;

(c) flowing over the entire envelope interior surface a phosphor coating paint slurry comprising finely divided phosphor material suspended in aqueous vehicle having dissolved therein water soluble binder material to provide the phosphor slurry with a predetermined viscosity to deposit a predetermined weight of phosphor material slurry onto said envelope;

(d) lehring in one step the coated envelope at a sufficient temperature and for a sufficient time to burn out and remove residual binders from the applied material coatings; and

(e) end cleaning said envelope to remove reflective material and phosphor material from the envelope end portions for a sufficient distance to permit cathode carrying amounts to be sealed in the cleaned ends thereof.

4,088,803

ELECTRICAL CONTACT AND PROCESS OF MANUFACTURE

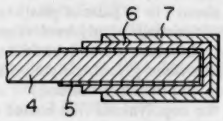
Masatoshi Kubo, Tokyo; Toshito Hara, Sagamihara; Yuji Hayashi, Susaka; Makoto Kassai, Yokohama; Norio Matsumoto, Kawasaki; Tsuneyoshi Nishi, Yokohama; Koushichi Suzuki; Michiko Kodama, both of Yokohama, and Kaduwo Sintani, Tokyo, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Sep. 15, 1975, Ser. No. 613,438

Claims priority, application Japan, Dec. 27, 1974, 49-3731; Sep. 19, 1974, 49-107129; Feb. 7, 1975, 50-15450

Int. Cl.² C25D *5/50;* **H01H** *1/02*

U.S. Cl. 427—123 **20 Claims**



1. A process for producing an electrical switch contact consisting of the steps of:

forming directly on a ferromagnetic, metallic body an inner metallic layer comprising at least one low melting temperature metal having a melting temperature lower than 500° C and being selected from the group consisting of tin, lead, indium, cadmium and zinc; and

forming on said inner metallic layer a single outer non-porous metallic layer comprising at least one high melting temperature metal having a melting temperature higher than 1500° C, and being selected from the group consisting of rhodium, rhenium, ruthenium, iridium, tungsten and molybdenum.

9. A process for producing an electrical switch contact comprising the steps of:

forming on a ferromagnetic, metallic body an inner metallic layer comprising at least one low melting temperature metal having a melting temperature lower than 500° C and being selected from the group consisting of tin, lead, indium, cadmium and zinc;

electrolytically-plating on said inner metallic layer an outer metallic layer comprising at least one high melting temperature metal having a melting temperature higher than 1500° C and selected from the group consisting of rhodium, rhenium and ruthenium, and;

heating said inner and outer metallic layers to a temperature exceeding the melting point of said low melting metal so as to produce diffusion therebetween.

4,088,804

CEMENTITIOUS COATINGS AND METHOD

Charles E. Cornwell, 7104 Marian Dr., and Mark Plunguian, 6912 Columbia Dr., both of Alexandria, Va. 22307

Continuation-in-part of Ser. No. 610,990, Sep. 8, 1975, Pat. No. 4,039,170, and Ser. No. 649,895, Jan. 16, 1976, Pat. No. 4,036,839. This application Feb. 16, 1977, Ser. No. 768,949

Int. Cl.² C04B *7/35;* **B32B** *13/04, 13/06;* **C04B** *39/02*

U.S. Cl. 428—220 **8 Claims**

1. A coating of about 2 mils to about 60 mils thickness of an hydraulic cement composition which comprises in weight percent a dry component of mineral cement selected from the group of portland and calcium aluminate cement, 100; a mineral aggregate of 100 mesh or finer selected from the group of

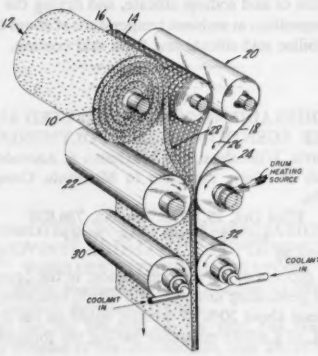
calcite and silica and mixtures thereof, 15–60; pozzolonic fly ash, 0–15; calcium stearate, 0–1; color pigments, 0–5; and a cement accelerator, 0–3; and a liquid component to be admixed to the dry component, of water, 35–50; a synthetic polymer latex selected from the group of polymers which are film-forming at ambient temperature, 5–30, with an equivalent polymer solids of 2.5–16; a super water reducer selected from the group of polymers comprising the alkali metal salts of melamine sulfonic acid partially condensed with formaldehyde, the alkali metal salt of naphthalene sulfonic acid partially condensed with formaldehyde, and about 30–90 percent of the alkali metal salt of a high molecular weight condensation product of naphthalene-sulfonic acid and the balance 70–10 percent being the alkali salt of gluconic acid, 0.5–3.0; sodium nitrite, 0.1–0.3; a cement accelerator, on a dry basis, 0–3; and a cement retarder, 0.05–0.5.

4,088,805

REINFORCED THERMOPLASTIC FOAM SHEET

Donald E. Wiegand, Minneapolis, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Apr. 14, 1975, Ser. No. 567,722
Int. Cl.² B32B *3/26*
U.S. Cl. 428—310 **12 Claims**



1. A reinforced low density thermoplastic foam sheet comprising:

a. a first layer;

b. said first layer being a sheet of low density thermoplastic foam of a density not over about 10 pounds per cubic foot;

c. a second layer;

d. said second layer being a thermoplastic film having a tackifying temperature which is within ± 10° F of that of the foam sheet;

e. a third layer between the first and second layers;

f. said third layer being a biaxially oriented polypropylene net-like structure having a tackifying temperature at least 50° F higher than the tackifying temperature of the foam sheet and the film;

g. said net-like structure being at least partially embedded into said first layer, said second layer being in contact with said first layer;

h. the second layer being heat sealed to the first layer through the interstices of said net-like structure; and

i. said net-like structure being heat sealed to neither said first nor said second layer.

4,088,806

INTUMESCENT-ABLATOR COATINGS USING ENDOTHERMIC FILLERS

Paul M. Sawko, and Salvatore R. Riccitiello, both of San Jose, Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 23, 1976, Ser. No. 753,964
Int. Cl.² B32B *15/08*; C08K *5/01, 5/02*
U.S. Cl. 428—332 **10 Claims**

1. An intumescent-ablator coating composition which comprises:

an intumescent agent, a binder system, and an endothermic filler having a decomposition temperature about or within the exothermic temperature region of the intumescent agent, said filler being present in a quantity ranging from about 5 to 30% of the combined weight of said intumescent agent and binder system.

8. A method of protecting a substrate with an intumescent-ablator composition, which comprises:

coating said substrate with an intumescent-ablator composition comprising an intumescent agent, a polymeric binder system, and an endothermic filler having a decomposition temperature about or within the exothermic temperature region of the intumescent agent, said filler being present in a quantity ranging from about 5 to 30% of the combined weight of said intumescent agent and binder system.

9. The method of claim 8, wherein said intumescent-ablator composition is applied as a coating of 20 to 100 mils thickness.

4,088,807

SHAPED ARTICLES OF CELLULOSIC PLASTICS HAVING ABRASION-RESISTANT COATING

Nobuhiro Sakata, Ashiya, and Toshihiro Suzuki, Yokohama, both of Japan, assignors to Nippon Sheet Glass Co., Ltd. and Nippon Pelnox Corporation, both of, Japan

Division of Ser. No. 459,851, Apr. 10, 1974, Pat. No. 3,966,665. This application Jan. 8, 1976, Ser. No. 647,644
Int. Cl.² B32B *23/08*
U.S. Cl. 428—334 **12 Claims**

1. A shaped article of cellulosic plastic having improved abrasion resistance at its surface, which is prepared by coating the surface of a shaped article of cellulosic plastics with a surface hardening coating composition consisting of a mixture of (a) methylolmelamine, wherein at least a part of the methylol groups are optionally alkyletherified and (b) 0.1 to 1.5 equivalents, per equivalent of said methylolmelamine, of an aliphatic or alicyclic polyhydric alcohol, and/or a pre-condensation product between the components (a) and (b), a catalyst and a diluent, and baking the coated article at a temperature from 60° C to the heat-distortion temperature of said article to cure the coating.

4,088,808

SHAPED ARTICLES OF HYDRAULIC CEMENT COMPOSITIONS WITH A GLOSSY REFLECTIVE SURFACE AND REINFORCED WITH FIBER GLASS

Charles E. Cornwell, 7104 Marlan Dr., and Mark Plunguian, 6912 Columbia Dr., both of Alexandria, Va. 22307

Continuation-in-part of Ser. No. 649,895, Jan. 16, 1976, Pat. No. 4,036,839, which is a continuation-in-part of Ser. No. 591,095, Jun. 27, 1975, Pat. No. 3,995,086. This application Aug. 30, 1976, Ser. No. 718,522
The portion of the term of this patent subsequent to Nov. 30, 1993, has been disclaimed.
Int. Cl.² B28B *1/16*; B32B *5/18*; B28B *1/20, 7/34*
U.S. Cl. 428—409 **7 Claims**

1. An improved shaped article with a reflective glossy surface comprising a composition of about 100 parts hydraulic cement selected from the group of portland cement, calcium aluminate cement, and gypsum cement, 10–400 parts aggregate, 0.25–2.0 parts water reducer selected from the group of

polymers consisting of the alkali metal salts of melamine sulfonic acid partially condensed with formaldehyde, the alkali metal salt of naphthalene-sulfonic acid partially condensed with formaldehyde, and about 30–90 percent of the alkali metal salt of a high molecular weight condensation product of naphthalene-sulfonic acid and the balance 70–10 percent being the alkali metal salt of gluconic acid, 0.01–0.25 parts curing retarder, and 0–10 parts color pigments, all in parts by weight wherein the improvement comprises the inclusion of 10–30 parts by weight of pozzolanic fly ash and reinforcing fiber glass fabric or chopped fiber glass.

2. An improved method for producing a shaped article with a reflective glossy surface comprising the steps of dispersing in water about 100 parts by weight of an hydraulic cement selected from the group of portland cement, calcium aluminate cement, and gypsum cement, 10–400 parts aggregate, 0.25–2.0 parts water reducer selected from the group of polymers consisting of the alkali metal salts of melamine sulfonic acid partially condensed with formaldehyde, the alkali metal salt of naphthalene-sulfonic acid partially condensed with formaldehyde, and about 30–90 percent of the alkali metal salt of a higher molecular weight condensation product of naphthalene-sulfonic acid and the balance 70–10 percent being the alkali metal salt of gluconic acid, 0.01–0.25 parts curing retarder, and 0–10 parts color pigments, all in parts by weight, where the improvement comprises the steps of adding 10–30 parts by weight of pozzolanic fly ash to the cementitious composition, casting or spraying the dispersion thus formed into a synthetic polymer mold with a glossy water-repellent surface, or a mold coated with synthetic polymer, said polymer being selected from the group comprising polystyrene, polyethylene, polypropylene, polybutylene, polyacrylate, polyester, polyamide, epoxy, fluoroplastic, acrylonitrile-butadiene-styrene, and polyvinyl chloride and its copolymers, spraying a coating of the cementitious material on the mold surface, then incorporating in said mold reinforcing fiber glass fabric or chopped fiber glass and filling the mold with additional cementitious material, curing the composite material, and then removing the reinforced casting from the mold.

4,088,809

LOW DISSIPATION FACTOR ELECTROSTATIC EPOXY WIRE COATING POWDER

Irving N. Elbling, Pittsburgh, and Howard E. Saunders, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 661,074, Feb. 25, 1976, Pat. No. 4,040,993. This application Mar. 17, 1977, Ser. No. 778,526
Int. Cl.[2] B05D *1/04, 1/24, 1/06*
U.S. Cl. 428—379 **17 Claims**

1. A method of coating a metallic object with a coating of powder made by

(A) preparing by dry mixing a composition which comprises:

(1) about 20 to about 80 phr of a first diglycidyl ether of bisphenol A having an E.E.W. of at least 1600 and a Durran's softening point of at least 113° C;

(2) about 10 to about 60 phr of a second diglycidyl ether of bisphenol A having an E.E.W. of 700 to 900 and a Durran's softening point of at least 112; and,

(3) about 5 to about 50 phr of a third diglycidyl ether of bisphenol A having an E.E.W. of less than 1000 and a Durran's softening point of less than 105° C;

(4) about 10 to about 60 phr of a preprepared epoxy ester, the epoxy portion of said ester being derived from a diglycidyl ether of bisphenol A having an E.E.W. of at least about 400 and a Durran's softening point of at least about 70, and the ester portion being derived from a dibasic acid having the formula HOOC—(CH_2)m — COOH, where m is about 18 to about 54; and

(5) about 5 to about 20 phr of a curing agent for said diglycidyl ethers, at least about 10% by weight of the anhydride equivalent weight of said curing agent being selected from the group consisting of trimellitic anhydride, esterified trimellitic anhydride, and mixtures thereof;

(B) hot melt mixing said composition;

(C) cooling said composition to form a solid; and

(D) grinding said composition into a powder having a particle size of about 5 to about 149 microns, said method comprising:

(1) applying said coating powder to said metallic object with an electostatic means selected from the group consisting of a gun and a fluidized bed; and

(2) heating said coating powder at about 200 to about 400° C for less than about 1 minute to melt and cure said powder.

4,088,810

ALKALI METAL SILICATE-ZINC HYDROXYCHLORIDE COATING COMPOSITION

James R. Lodge, Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 7, 1973, Ser. No. 358,030
Int. Cl.[2] B32B *13/04, 11/04*
U.S. Cl. 428—446 **11 Claims**

1. A method of forming a hard, durable, water-insoluble, water-permeable, weather-resistant, inorganic, algicidal coating on a relatively rigid inorganic substrate useful as exterior building material, comprising the steps of applying to said substrate an inorganic coating composition comprising about 55 to 70 weight percent water, a water-soluble sodium silicate having an $Na_2O:SiO_2$ weight ratio of 1:2.75 to 1:3.75, and zinc hydroxychloride of the formula $Zn_5(OH)_8Cl_2$, there being in said composition at least 0.5 mole of said zinc hydroxychloride for each mole of said sodium silicate, and drying the resulting applied composition at ambient temperature of about 60 to 100° F to insolubilize said silicate and form said coating.

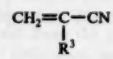
4,088,811

1,4-CYCLOHEXADIENE COMPOUNDS USED AS CHAIN TRANSFER AGENTS IN NITRILE POLYMERIZATION

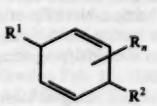
Alva F. Harris, Wilbraham, and Maximino S. Azevedo, Springfield, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 29, 1976, Ser. No. 736,838
Int. Cl.[2] C08F *20/42, 20/44*
U.S. Cl. 526—89 **18 Claims**

1. In the process of the polymerization, in the presence of a free radical generating initiator, of a nitrile composition comprising at least about 20% by weight, based on the total polymer weight, of a nitrile monomer having the formula:



where R^3 is hydrogen, an alkyl group of 1 to 4 carbon atoms or halogen; and one or more ethylenically unsaturated copolymerizable comonomer materials, the improvement which comprises conducting the polymerization in the presence of an effective amount of a molecular weight regulator consisting of a cyclohexa-1,4-diene compound having the formula:



wherein R^1 and R^2 each independently represent hydrogen or an alkyl group of 1 to 4 carbon atoms; each R independently represents an alkyl group of 1 to 4 carbon atoms, or one of two pairs of R groups taken together may represent one or two fused benzo groups; and n is an integer of 0 to 4.

4,088,812

PROCESS FOR PREPARING POLYOLEFINS

Kazuo Matuura, Kawasaki; Masaomi Matsuzaki, Yokohama; Humiaki Oshimi, Kawasaki; Nobuyuki Kuroda, Yokohama, and Mituji Miyoshi, Kanagawa, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan

Continuation of Ser. No. 534,088, Dec. 18, 1974, abandoned. This application Dec. 20, 1976, Ser. No. 752,003

Claims priority, application Japan, Dec. 27, 1973, 48/44364; May 21, 1974, 49/56119

Int. Cl.[2] C08F *4/02, 10/02*

U.S. Cl. 526—121 10 Claims

1. Process for preparation of polyolefins by polymerizing or copolymerizing olefins in the presence of a catalyst comprising at least one compound selected from the group consisting of a titanium compound and a vanadium compound supported on a solid carrier and an organometallic compound, from metals of Group I–IV of the Periodic Table,

said solid carrier consisting of a product containing from 0.1% to 20% by weight of sulfur and obtained by treatment with SO_3 of at least one member selected from the group consisting of

(1) a first oxide of group II–IV metals of the Periodic Table, and

(2) a second oxide which is a double oxide consisting of two of the said first oxides or a double oxide consisting of said first oxide and an oxide of a metal from a group other than Group II–IV metals,

the treatment with sulfur trioxide being conducted for a period of from 1 minute to 24 hours at a temperature from room temperature to 1000° C.

4,088,813

PROMOTERS IN THE POLYMERIZATION OF MONOVINYL-AROMATIC COMPOUNDS WITH PRIMARY LITHIUM INITIATORS

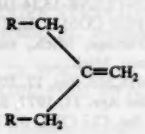
Daniel H. Willis, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 695,618, Jun. 14, 1976, Pat. No. 4,067,929, which is a division of Ser. No. 616,534, Sep. 25, 1975, Pat. No. 3,992,483. This application Apr. 1, 1977, Ser. No. 783,515

Int. Cl.[2] C08F *12/08, 12/12*

U.S. Cl. 526—173 13 Claims

1. A process which comprises polymerizing at least one first monovinyl-substituted aromatic compound monomer with a primary hydrocarbyl lithium polymerization initiator and a 1,1-dialkylethylene promoter under solution polymerization conditions of temperature and pressure, wherein said process employs an amount of said 1,1-dialkylethylene promoter effective to promote said polymerization of said monovinyl-substituted aromatic monomer with said primary hydrocarbyl lithium initiator, and said 1,1-dialkylethylene promoter is represented by the formula:



wherein each R is selected from hydrogen, methyl, or ethyl.

4,088,814

MORPHOLINE DERIVATIVES

Bernard Joseph McLoughlin, and Allen John Guildford, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 567,011, Apr. 10, 1975, Pat. No. 4,010,266. This application Oct. 22, 1976, Ser. No. 735,125

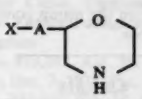
Claims priority, application United Kingdom, May 7, 1974, 20013/74

The portion of the term of this patent subsequent to Mar. 1, 1994, has been disclaimed.

Int. Cl.[2] C07D *265/30*

U.S. Cl. 542—455 5 Claims

1. A morpholine derivative of the formula:



I

wherein A stands for a vinylene (—CH=CH—) radical and X stands for a phenyl radical which is unsubstituted or which is substituted by one or two substituents selected from the group consisting of halogen atoms, alkyl and alkoxy radicals of 1 to 6 carbon atoms and aryloxy radicals of 6 to 10 carbon atoms, the aryloxy radicals themselves being unsubstituted or substituted by one or two substituents selected from halogen atoms and alkyl radicals of 1 to 4 carbon atoms; or a pharmaceutically-acceptable acid-addition salt thereof.

4,088,815

3-HETEROTHIO-7-UREIDO CEPHALOSPORINS

Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

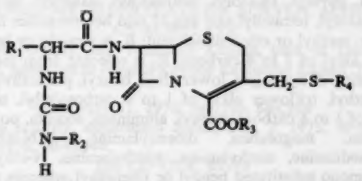
Continuation-in-part of Ser. No. 507,906, Sep. 20, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,795

The portion of the term of this patent subsequent to Dec. 7, 1993, has been disclaimed.

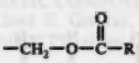
Int. Cl.[2] C07D *501/36*

U.S. Cl. 544—26 8 Claims

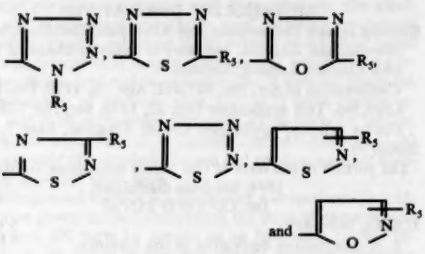
1. A compound of the formula:



wherein R_1 is selected from the group consisting of phenyl, benzyl, phenethyl, and monosubstituted phenyl, benzyl, and phenethyl wherein said substituent is one member selected from the group consisting of Cl, Br, alkyl of 1 to 4 carbons, hydroxy, and alkoxy of 1 to 4 carbons; R_2 is straight or branched chain alkyl of 1 to 4 carbons; R_3 is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbons, benzyl, phenethyl, diphenylmethyl, trimethylsilyl, trimethylstannyl, aluminum, an alkaline earth metal, an alkali metal, and the group



wherein R is selected from the group consisting of alkyl of 1 to 4 carbons, phenyl, benzyl, and phenethyl; and R_4 is selected from the group consisting of



wherein R_5 is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbons.

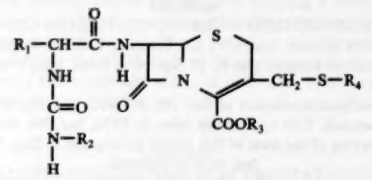
4,088,816

3-HETEROTHIO SUBSTITUTED 7-(UREIDO-HETEROACETYL) CEPHALOSPORINS

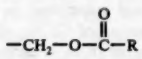
Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 507,900, Sep. 20, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,796
The portion of the term of this patent subsequent to Nov. 16, 1993, has been disclaimed.
Int. Cl.[2] C07D *501/56*; A61K *31/545*
U.S. Cl. 544—27 **14 Claims**

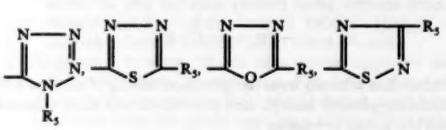
1. A compound of the formula:



wherein R_1 is a hetero group attached at an available carbon atom and is selected from the group consisting of thienyl, furyl, pyrryl, pyridyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, thiadiazolyl, tetrazolyl and any of said heterocyclics having a Cl, Br, methyl or ethyl substituent; R_2 is straight or branched chain alkyl of 1 to 4 carbons; R_3 is selected from the group consisting of hydrogen, lower alkyl, benzyl, phenethyl, diphenylmethyl, tri(lower alkyl of 1 to 4 carbons)silyl, tri(lower alkyl of 1 to 4 carbons)stannyl, aluminum, sodium, potassium, calcium, magnesium, dibenzylamine, N,N-dibenzylethylenediamine, methylamine, triethylamine, N-ethylpiperidine, mono substituted benzyl or phenethyl wherein the substituent is Cl, Br, lower alkyl of 1 to 4 carbons, or lower alkoxy of 1 to 4 carbons, and the group



wherein R is selected from the group consisting of lower alkyl of 1 to 4 carbons, phenyl, benzyl, phenethyl, and mono substituted phenyl, benzyl, or phenethyl wherein said substituent is Cl, Br, lower alkyl of 1 to 4 carbons, or lower alkoxy of 1 to 4 carbons; and R_4 is selected from the group consisting of



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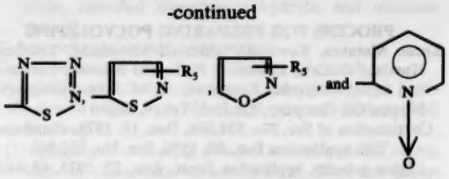


wherein R_5 is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbons.

4,088,817

PROCESS FOR THE PRODUCTION OF NON-LACHRYMATORY NITRO AMINES

Jerry Hoyt Hunsucker, and Robert Wayne Shelton, both of Terre Haute, Ind., assignors to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Jan. 27, 1977, Ser. No. 763,272
Int. Cl.[2] C07D *295/06*
U.S. Cl. 544—162 **1 Claim**

1. An improvement in the process for the production of P-1487 from the reaction of 1-nitropropane, 37% formaldehyde and morpholine the improvement comprising mixing 1-nitropropane and 37% formaldehyde at a temperature of 40°–42° C, adding morpholine under isothermal conditions, holding the mixture at 40°–42° C for a two hour period following the addition of morpholine, cooling the reaction mixture to less than 30° C, separating the oil layer, and concentrating the oil layer to P-1487 by removing excess water.

4,088,818

PROCESS FOR THE RECOVERY OF FORMALDEHYDE PRESENT IN WASTE WATERS

Pierino Radici, Turate (Como); Pietro Erini, Olgiate Olona (Varese); Umberto Santini, Legnano (Milan), and Paolo Colombo, Saronno (Varese), all of Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Jun. 3, 1976, Ser. No. 692,408
Claims priority, application Italy, Jun. 11, 1975, 24240 A/75
Int. Cl.[2] C07D *295/02*
U.S. Cl. 544—186 **15 Claims**

1. A process for the recovery of formaldehyde from waste water containing the latter together with one or more lower saturated carboxylic acids which comprises:

(1) reacting at a temperature of from 0° to 90° C said waste water with an amount of ammonia substantially equal to that stoichiometrically required to convert the formaldehyde present in said waste water into hexamine without substantial salification of said one or more lower saturated carboxylic acids, to thereby obtain an aqueous solution containing hexamine and said carboxylic acids, and

(2) evaporating said aqueous solution at a temperature of from 20° to 120° C during a period of from 2 hours to 3 seconds to remove said water and said one or more lower saturated carboxylic acids in their acid form, thereby to recover said hexamine in solid form.

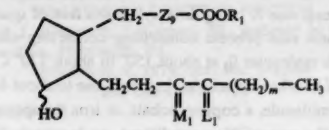
4,088,819

3,7-INTER-M-PHENYLENE-13,14-DIHYDRO-9-DEOXY-PGF COMPOUNDS

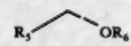
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,243, Sep. 17, 1975, Pat. No. 4,033,989. This application Apr. 11, 1977, Ser. No. 786,707
Int. Cl.[2] C07C *69/76*
U.S. Cl. 560—61 **25 Claims**

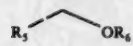
1. A prostaglandin analog of the formula



wherein m is one to 5, inclusive; wherein M_1 is

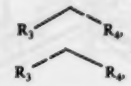


or

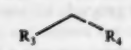


wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

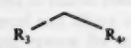
wherein L_1 is



or a mixture of



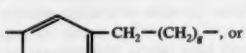
and



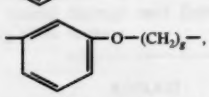
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and

wherein Z_9 is



(1)



(2)

wherein *g* is one, 2, or 3.

4,088,820

TRANSESTERIFICATION OF OLEFINS

Louis Schmerling, Riverside, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Oct. 28, 1976, Ser. No. 736,649

Int. Cl.² C07C *67/00, 69/14, 69/78*

U.S. Cl. 560—103 **9 Claims**

1. A process for the transesterification of a carboxylic acid ester of an alkyl-, cycloalkyl- or aralkyl- alcohol containing at least two carbon atoms in the alkyl moiety with an olefin selected from the group consisting of alkenes containing two to twenty carbon atoms and cycloalkenes containing four to eight carbon atoms which comprises reacting said ester with said olefin containing a greater number of carbon atoms than said alcohol in the presence of a catalytic amount of tin halide, wherein said amount of tin halide is stoichiometrically less than the stoichiometric amount of said olefin, at a temperature in the range of from about 0° C to about 150° C and a pressure in the range of from about atmospheric to about 100 atmospheres, and recovering the resultant esterified olefin.

4,088,821

CYCLOPENTANE DERIVATIVES

Michael Peter Lear Caton, Upminster, and Trevor Parker, Romford, both of England, assignors to May & Baker Limited, United Kingdom

Division of Ser. No. 573,107, Apr. 30, 1975, which is a division of Ser. No. 423,376, Dec. 7, 1973, Pat. No. 3,933,890, which is a division of Ser. No. 332,660, Feb. 15, 1973, Pat. No. 3,923,872.

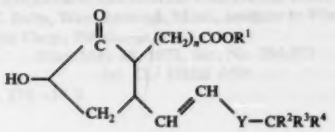
This application Jan. 26, 1976, Ser. No. 652,329

Claims priority, application United Kingdom, Feb. 18, 1972, 7640/72

Int. Cl.² C07C *177/00*

U.S. Cl. 560—121 **3 Claims**

1. A cyclopentane derivative of the formula:



wherein R^1 represents hydrogen or alkyl of 1 through 12 carbon atoms, R^2 and R^3 represent hydrogen or alkyl of 1 through 4 carbon atoms, R^4 represents hydrogen or alkyl of 1 through 10 carbon atoms, n represents 6 and Y represents hydroxymethylene or carbonyl, and, when R^1 represents hydrogen, non-toxic salts thereof.

4,088,822

SIMULTANEOUS PRODUCTION OF METHACRYLIC ACID AND A METHACRYLATE OR ACRYLIC ACID AND AN ACRYLATE

Masanobu Ogawa, and Toshitake Kojima, both of Takasaki, Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed May 21, 1976, Ser. No. 688,916

Claims priority, application Japan, Jun. 2, 1975, 50-66343; Jun. 2, 1975, 50-66344

Int. Cl.² C07C *69/54*

U.S. Cl. 560—207 **12 Claims**

1. A process for simultaneously producing methacrylic acid and a methacrylate or acrylic acid and an acrylate, which process comprises reacting methacrolein or acrolein with an aliphatic alcohol and molecular oxygen in vapor phase in the presence of a catalyst consisting essentially of (1) palladium, (2) phosphorous and (3) oxygen as essential elements and (4) antimony as an optional element.

4,088,823

PROMOTED LIQUID PHASE OXIDATION OF ALKYL AROMATIC COMPOUNDS

Hans D. Holtz, and Lloyd E. Gardner, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

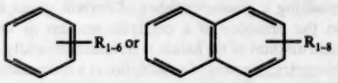
Filed Oct. 7, 1975, Ser. No. 620,465

Int. Cl.² C07C *29/00, 51/33, 67/05*

U.S. Cl. 560—236 **11 Claims**

1. A liquid phase process for oxygenating an alkyl-sub-

stituted aromatic compound corresponding to the generic formulas



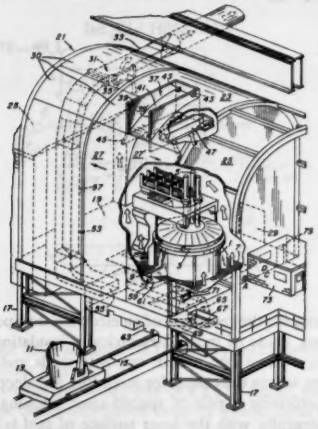
wherein each R is selected from branched or unbranched alkyl groups having from one to about 6 carbon atoms, or halogen atoms, at least one R being an alkyl group free of quaternary carbon atoms said process comprising contacting said compound with molecular O_2 at about 150° to about 170° C. in the presence of an alkanoic acid having from one to about 6 carbon atoms per molecule, a copper, cobalt, or iron compound soluble under the oxygenating conditions, an inorganic bromine compound and an inorganic nitrate compound.

4,088,824

ELECTRIC FURNACE STATION NOISE AND SMOKE POLLUTION CONTROL SYSTEM

Raymond J. Bonistalli, LaGrange, Ill., assignor to Obenchain Corporation, Pittsburgh, Pa.

Filed Nov. 8, 1976, Ser. No. 739,809
Int. Cl.[2] H05B 7/20
U.S. Cl. 13—9 R 3 Claims



1. In an electric arc furnace station having a tiltable, top-chargeable electric furnace with associated electrodes and a rotatable top with means for charging the furnace, said furnace having a pour spout and means for collecting refined metal from the station, and a housing covering the top and sides of the furnace, the height thereof sufficient to contain the furnace and associated electrodes in raised or lowered position, the width thereof sufficient to enable rotating of the furnace roof during charging thereof and tilting of the furnace and electrodes during tapping, means for noise abatement and for collecting and conveying pollutant gases during charging, meltdown, refining and tapping of the furnace comprising:

movable sections on said housing to enable entry thereto of charging means for the furnace comprising first entry means in the upper section of the housing for entry of cables adapted to support a charging bucket and further entry means for entrance into said housing of said charging bucket and of operating personnel;

exhaust means proximate the upper area of the housing to remove gases therefrom during charging, meltdown, refining and tapping; and

an air curtain apparatus adjacent said first entry means, arranged to direct a flow of dirty air from within said housing transversely across said first entry and toward said exhaust means while cables supporting a charging bucket extend through said first entry means during charging of the furnace.

4,088,825

ELECTRIC FURNACE WALL CONSTRUCTION

Victor H. Carr, Shelbyville, Ind., assignor to General Electric Company, Carmel, Ind.

Filed Aug. 4, 1976, Ser. No. 711,555
Int. Cl.[2] F27D 1/00
U.S. Cl. 13—25 36 Claims

17. An electric furnace wall comprising:

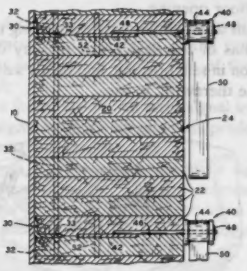
a metallic outer wall portion;

a thermally insulating liner including a plurality of ceramic fiber batts compressibly layer stacked,

the insulating liner being placed contiguous to the outer wall portion and forming an inner furnace wall portion;

a plurality of electrically insulating hanger members for supporting at least one electrical heating element within the furnace;

anchoring means associated with each hanger member, the



anchoring means being placed between a pair of adjacent ceramic fiber batts for securing the hanger members in a projecting relationship inwardly and away from the inner furnace wall portion.

4,088,826

GAS-INSULATED ELECTRICAL APPARATUS WITH FIELD-INSTALLABLE PARTICLE TRAPS

Philip C. Bolin, West Borough, Mass., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 13, 1977, Ser. No. 796,577
Int. Cl.[2] H01B 9/06
U.S. Cl. 174—14 R 10 Claims

1. A gas-insulated transmission line comprising:

an elongated cylindrical outer sheath having an opening therein;

an elongated cylindrical inner conductor disposed within said outer sheath;

an insulating gas disposed within said outer sheath and electrically insulating said inner conductor from said outer sheath;

means for insulatably supporting said inner conductor within said outer sheath; and

means for trapping particles present within said outer sheath comprising:

a base member sealingly secured to said outer sheath adjacent the periphery of said outer sheath opening;

a mounting member fixedly secured to said base member and directed inwardly towards said inner conductor; and

a trap member of a size smaller than said outer sheath opening fixedly secured to said mounting member.

4,088,827

INSERT MOUNT AND DEVICE

John E. Kohaut, West Orange, N.J., assignor to Raceway Components, Inc., Nutley, N.J.

Filed Jan. 20, 1975, Ser. No. 542,260
Int. Cl.[2] H02G 3/08
U.S. Cl. 174—48 4 Claims

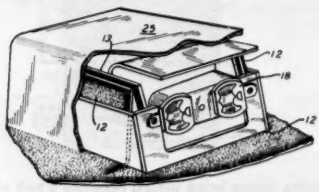
1. An electrical insert wiring device, positioned, in use, at an opening station in a floor having a flexible covering sheet thereover and said sheet, in use having tab means formed therein overlying said floor opening, said device comprising:

(a) an axially elongated upper wire receiving body portion,

(b) a bottom wall and parallel, spaced side walls in said upper wire receiving portion, disposed above said opening station on positioning the insert wiring device thereon,

(c) a lower wire receiving body portion positioned, in use, in said floor opening,

(d) means axially adjustably connecting the upper and lower portions of the device and thereby disposing the lower portion in said opening, and below said upper portion and in line therewith, in use,



(e) slotted tab receiving means in the bottom wall of said upper portion and defining openings through said bottom wall thereof, said openings disposed in spaced relation to each other and spaced from the side walls of said upper wire receiving portion,

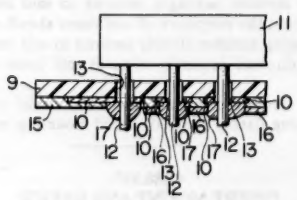
whereby said tab means, in use of the wiring device, are folded and passed through said slotted tab receiving means in the bottom wall of the upper portion and positioned within said upper portion along and parallel to the side walls thereof, clearing said opening for passage of wires therethrough.

4,088,828

PRINTED CIRCUIT BOARD

Yoshio Yamamoto, Hirakata; Masaki Sono, Neyagawa, and Masahiko Ekeuti, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 1, 1976, Ser. No. 662,440
Claims priority, application Japan, Mar. 4, 1975, 50-26907
Int. Cl.[2] H05K *1/00*
U.S. Cl. 174—68.5 **3 Claims**



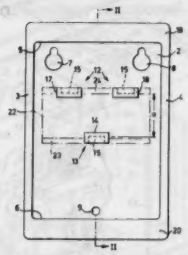
1. A printed circuit board comprising an insulating base, a conductor pattern printed on said insulating base, a first solder resist layer formed on the entire surface of the conductor pattern remaining lands which are for soldering thereon, and a second solder resist layer for prevention of bridging of interland gaps by solder, said second solder resist layer being formed on said first solder resist layer at least over portions thereof where interland gaps are narrow.

4,088,829

HOUSING FOR ELECTRICAL COMPONENTS

Edgar Albert Philip Milcoy, South Milton, near Kingsbridge, England, assignor to Arrow-Hart (Europe) Limited, Plymouth, England

Filed Jul. 15, 1976, Ser. No. 705,575
Int. Cl.[2] H05K *5/00*
U.S. Cl. 174—53 **2 Claims**



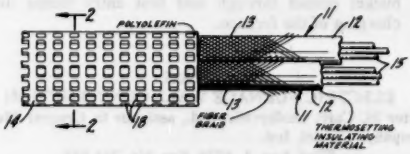
1. A casing for the reception of an electrical component, said casing being made of molded electrically insulating material and having at least one pair of opposite walls and a bottom wall, means within the casing for mounting the electrical component comprising a pair of spaced-apart hooking members molded integrally with the inner surface of said bottom wall and facing one of said pair of walls, and another hooking member also molded integrally with said bottom wall but facing the other of said pair of walls, said hooking members having hook portions and side portions which cooperate to hold the electrical component securely, said side portions strengthening said hook portions.

4,088,830

ELECTRICAL CABLE WITH INSULATED AND BRAID COVERED CONDUCTORS AND PERFORATED POLYOLEFIN ARMOR

Robert V. Wargin, Darien, Ill., and Clinton A. Boyd, Tulsa, Okla., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 24, 1976, Ser. No. 717,436
Int. Cl.[2] H01B *3/28, 9/06*
U.S. Cl. 174—113 R **4 Claims**



1. An electrical cable having a plurality of conductors, each of said conductors being surrounded by a layer of oil- and brine-resistant thermosetting insulating material, said layer of insulating material being surrounded and confined by a braid layer and an outer armor surrounding said conductors formed of a high temperature, high molecular weight polyolefin adapted to permit free flow of well fluids into the cable structure.

4,088,831
SYNCHRONIZATION FOR PCM TRANSMISSION SYSTEMS

John A. W. Butcher, Stansted, and Edward H. Lambourn, Enfield, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed May 20, 1976, Ser. No. 688,499

Claims priority, application United Kingdom, Jul. 3, 1975, 28022/75

Int. Cl.² H04L 7/00

U.S. Cl. 178—69.1 **20 Claims**

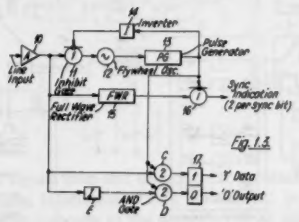


Fig. 1.5.

7. A pulse code modulation (PCM) system comprising:

a transmitter including

input means for binary bits of a PCM signal; and

N-stage distributor means coupled to said input means for introducing a position modulation of at least one of said binary bits without the addition of additional bits to said PCM signal to transmit an information signal having a given bit rate, where N is greater than one; and

a receiver including

a phase locked loop having

a phase comparator coupled to said distributor means,

a low pass filter coupled to the output of said phase comparator, and

a voltage controlled oscillator having its input coupled to the output of said filter and its output coupled to said phase comparator as a second input thereto;

said position modulation being produced at the output of said phase comparator.

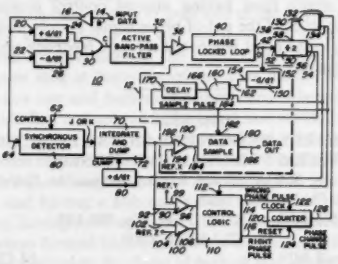
4,088,832
SPLIT PHASE CODE SYNCHRONIZER AND DEMODULATOR

Bruce Charles Eastmond, Downers Grove, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 12, 1976, Ser. No. 731,078

Int. Cl.² H04L 7/00

U.S. Cl. 178—69.1 **15 Claims**



1. A synchronizer for receiving encoded data of the split phase clock synchronous encoded type and recovering the clock signal therefrom, comprising:

reference signal means selectable to produce either a first or a second reference signal, each reference signal having the same frequency as the clock signal at a phase angle of 180° with respect to the other signal;

synchronous detecting means for synchronously detecting the received encoded data with the selected reference signal;

integrator means for producing an integral signal having a value representative of the integral of the synchronous detecting means output over each cycle of the selected reference signal;

comparator means for producing an error signal in response to the integral signal having a value within predetermined minimum and maximum values; and

control logic means for processing the error signals and selecting the alternate output from the reference signal means responsive to a predetermined condition thereof,

whereby the selected reference signal is synchronized to the clock signal.

4,088,833
CARRIER DETECTOR

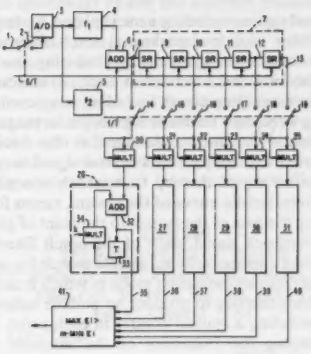
Dominique Noel Godard, Le Rouret, and Andrzej Tadeusz Milewski, Saint-Jeannet, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 10, 1976, Ser. No. 740,642

Claims priority, application France, Nov. 28, 1975, 75 36910

Int. Cl.² H04L 15/24

U.S. Cl. 178—88 **8 Claims**



1. A method for determining whether the signal received by the receiver in a synchronous data transmission system wherein data is transmitted by modulating a carrier, is a data signal or noise, said method being characterized in that it includes the steps of:

a. extracting from the received signal the frequency components f_1 and f_2 respectively defined as

$$f_1 = f_c - \tfrac{1}{2}T \text{ and } f_2 = f_c + \tfrac{1}{2}T$$

where

f_c is the carrier frequency, and

T is the signaling period;

b. summing said components;

c. sampling the summed components at the rate 1/T for each phase of N different phases of said rate 1/T, thereby providing N sum samples;

d. measuring the energy of each of said N sum samples for each of the N phases; and

e. comparing the N energies thus obtained with each other, and

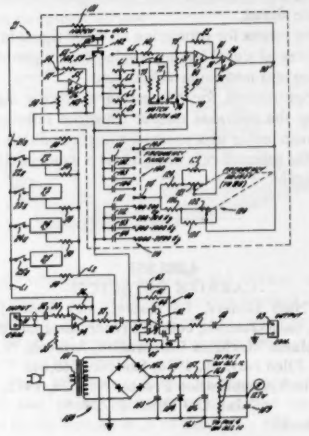
f. indicating that the received signal is a data signal when the largest of the N energies is greater than a predetermined multiple of the smallest one.

4,088,834

FEEDBACK ELIMINATION SYSTEM EMPLOYING NOTCH FILTER

George R. Thurmond, 4709 Shoalwood, Austin, Tex. 78756

Filed Jan. 3, 1977, Ser. No. 756,135
Int. Cl.[2] H03J 5/24
U.S. Cl. 179—1 FS 14 Claims



1. In a sound system including a microphone, a preamplifier, system amplifier, and loudspeaker, a notch filter assembly serially connected in the system and comprising, in combination, a plurality of active notch filters, each of the notch filters having a loop amplifying circuit including an operational amplifier having a resonant feedback network so arranged that in the normal mode an out-of-phase signal at the resonant frequency inverted with respect to a system signal is combined with said system signal thereby to establish a notch in the frequency characteristic curve of the system, means for manually increasing the gain of the system to the point of generating an acoustic feedback signal, each of the notch filters having means including a temporarily actuatable switch for switching the notch filter into an oscillating mode in which it oscillates at notch frequency thereby to produce an audible reference signal, means including a manual control in each notch filter for smoothly varying the frequency of the resonant network thereby sweeping the reference signal over the feedback-susceptible portion of the audio range for establishing a zero beat relation with the acoustic feedback signal so that when the notch filter is restored to its normal mode the notch is aligned with acoustic feedback signal thereby to effectively cancel the same.

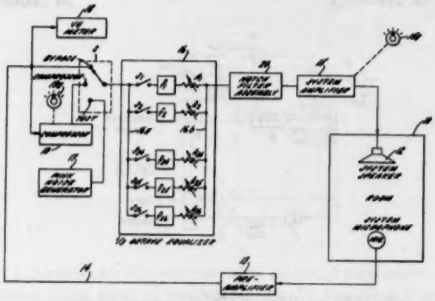
14. The method of removing an acoustic feedback signal in a sound system having a microphone, amplifier, gain control and loudspeaker, which comprises providing operational amplifiers each having a resonant loop circuit for selectively amplifying the signal in the system to produce an auxiliary signal which has a sharply peaked frequency characteristic and then following an adjusting procedure including the steps of (1) increasing the gain of the system until an acoustic feedback signal is produced, (2) temporarily increasing the gain in one of the loop circuits so that the circuit oscillates at the resonant frequency to produce an audible reference signal, (3) varying the resonant frequency smoothly to bring the reference signal into zero beat with the acoustic feedback signal, (4) applying the auxiliary signal to the system in relatively inverted relation with respect to the system signal to produce a notch in the frequency characteristic curve of the system at the frequency of the acoustic feedback signal for effective cancellation of the feedback signal, and repeating the adjusting procedure for each successively produced acoustic feedback signal.

4,088,835

COMPREHENSIVE FEEDBACK ELIMINATION SYSTEM EMPLOYING NOTCH FILTER

George R. Thurmond, Austin, Tex., and Harro K. Heinz, Deerfield, Ill., assignors to Rauland-Borg Corporation, by said Harro K. Heinz

Filed Feb. 7, 1977, Ser. No. 766,439
Int. Cl.[2] H03J 5/24
U.S. Cl. 179—1 FS 10 Claims



1. In a sound system including a microphone, a preamplifier, a system amplifier and loudspeaker, means for eliminating acoustical feedback comprising a band pass equalizer interposed in the system adjustable for substantially equalized response across the audio spectrum, a notch filter assembly having a summing buss for receiving a system signal and a plurality of active notch filters connected in parallel to said summing buss, each of the notch filters having a loop amplifier circuit including an operational amplifier with a resonant feedback circuit so arranged that an out-of-phase signal with respect to the system signal at the resonant frequency is applied to the summing buss thereby to establish a notch in the frequency characteristic curve of the system, means for manually increasing the gain of the system to the point of generating an acoustic feedback signal for use during an equalization procedure, a compressor temporarily interposed in the system during the equalization procedure for limiting the acoustic feedback signal to a safe and comfortable level, each of the notch filters having temporarily energizable means for causing the notch filter to oscillate at notch frequency thereby to produce an audible reference signal, means including a manual control in each notch filter for smoothly varying the frequency of the resonant network thereby sweeping the frequency of the reference signal over the feedback-susceptible portion of the audio range for establishing a zero beat relation with the acoustic feedback signal to align the notch with the acoustic feedback signal, each notch filter having manual control means for increasing the level of the out-of-phase signal thereby deepening the notch to the point where the acoustic feedback signal is effectively canceled.

4,088,836

ACOUSTICALLY RESPONSIVE SIGNAL INJECTION SYSTEM FOR HEADPHONE USERS

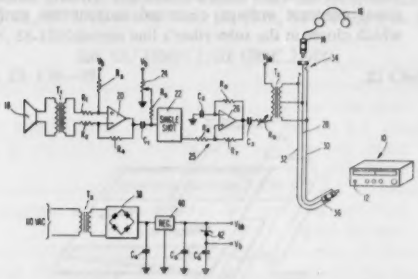
Donald D. Tech, S. Chelmsford, Mass., assignor to Antech Industries, S. Chelmsford, Mass.

Filed May 18, 1977, Ser. No. 798,107
Int. Cl.[2] H04R 3/00
U.S. Cl. 179—1 MN 14 Claims

1. The method of alerting an individual using headphones actively coupled to an operating source of audio information by a signal conductor, said headphones being of a type which significantly restricts his ability to hear ambient sounds, to the occurrence of a sound having a volume greater than a predetermined minimum value, comprising the steps of:

providing an acoustic pickup transducer for detecting ambient sounds;

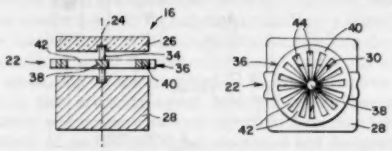
providing a signal modifying stage coupled between said signal conductor and said acoustic transducer and responsive to signals from said transducer to substantially modify the audio information being transmitted to said headphones in response to the detection of an ambient sound whose volume exceeds said predetermined value.



4,088,837
COMBINATION TELEPHONE AND CALCULATOR WITH COMMON KEYBOARD HAVING REVERSIBLE INDICIA

Thomas C. Singer, 302 S. Beverly Ave., Wheaton, Ill. 60187

Continuation-in-part of Ser. No. 673,674, Apr. 5, 1976, abandoned. This application Jan. 7, 1977, Ser. No. 757,627
Int. Cl.² H04M *1/21, 1/23, 11/00*
U.S. Cl. 179—2 DP **2 Claims**

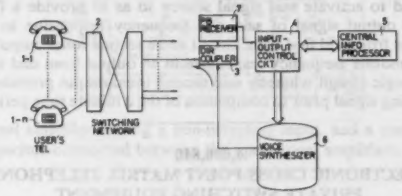


1. In a combination telephone set including a housing, a numeric keyboard disposed on the housing having at least ten keys and an electronic calculator contained within said housing, said keys being selectably usable as input means for said telephone set so as to generate a plurality of tones, and for the calculator so as to process data, and wherein at least ten indicia are disposed on the keys, respectively, the improvement comprising selection means for reversibly changing at least one of the indicia disposed on at least one of the keys from operation as the input means for the telephone set to another of the indicia for operation as the input means for the calculator, wherein said at least one of the keys has a central axis and includes top and bottom members, and wherein said indicia include first and second indicia, and said selection means comprise a shaft coaxially aligned with said axis and journaled between said members, and a spoked wheel fixedly attached to said shaft and rotatable from a first position to a second position and having a hub and a rim, each of the spokes of said wheel having the shape of an isosceles triangle, and each of the openings formed between said spokes having a shape substantially identical to the shape of each of said spokes, and wherein said top member is transparent, said bottom member has a side facing said top member and has a broken-line shape of said first and second indicia disposed thereon, whereby said first and said second of said indicia are visible through the transparent top member in said first and second positions of said spoked wheel, respectively.

4,088,838
VOICE RESPONSE SYSTEM

Kazuo Nakata, Kodaira; Akira Ichikawa, Kokubunji, and Akio Suehiro, Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 20, 1976, Ser. No. 751,985
Claims priority, application Japan, Jan. 14, 1976, 51-2803
Int. Cl.² H04M *11/00*
U.S. Cl. 179—2 A **15 Claims**

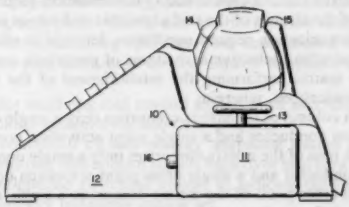


1. A voice response system including at least one push button telephone terminal at which push button signals may be selectively generated; push button receiver means for detecting said push button signals; control means for decoding said detected push button signals; voice synthesizer means for transmitting response voice signals to said push button telephone terminal in response to said control means; interconnecting means including a first directional coupler for interconnecting said telephone terminal with said receiver means and said voice synthesizer means; and analyzer means responsive to the output of said voice synthesizer means for analyzing a parameter of said response voice signals; said push button receiver means including inverse filter means controlled by the output of said analyzer means and connected to receive said push button signals from said directional coupler for flattening the spectrum of any response voice signals which may have been mixed with said push button signals in said directional coupler, and correlation detector means for detecting push button signals in the output from said inverse filter means.

4,088,839
TELEPHONE CALL TIMER

Anthony C. Stein, Jr., 3807 Pineland St., Fairfax, Va. 22030

Filed Oct. 14, 1975, Ser. No. 621,747
Int. Cl.² H04M *15/00*
U.S. Cl. 179—7.1 R **4 Claims**



1. A timer unit for telephone calls comprising an energy source, counter means driven by an oscillator for generating timing signals for establishing time periods for use in generating tonal signals of different frequencies to provide an audible indication of the expiration of fixed time limits after the initiation of a telephone call, the signals of one frequency indicating the start of the time period and periodic one minute intervals during the time period including the end of said selected time period and the signals of another frequency indicating a time interval of approximately 2½ minutes after initiation of the call circuit means connected to said counter means and responsive to said timing signals for providing the audible indication of the start of the time period, the periodic intervals during the time period, including the end thereof, and the occurrence of the 2½

minute time interval, said circuit means including a first and a second logic circuit and a programmable decoder having an input connected to a first output of the counter means, an output of said decoder being connected to an input of said second logic circuit, a second output of said counter means being connected to an input of said first logic circuit, an OR gate, the output of said first and said second logic circuits being connected to first and second inputs of said OR gate, said OR gate having a third input connected to receive a third output from said counter and said OR gate having its output connected to activate said signal source so as to provide a first tonal output signal of said one frequency responsive to an output from said first logic circuit and a second tonal output of said another frequency responsive to an output from said second logic circuit whereby said second tonal output provides a warning signal prior to completion of the 3 minute time period.

4,088,840

ELECTRONIC CROSS-POINT MATRIX TELEPHONE PRIVATE SWITCHING EQUIPMENT

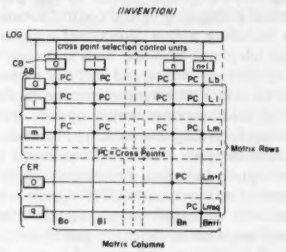
Andre Castet, Pessac, France, assignor to L'Electronique Appliquee, Montrouge, France

Filed Apr. 21, 1976, Ser. No. 679,045

Claims priority, application France, Apr. 21, 1975, 75 12285

Int. Cl.[2] H04Q *3/50*

U.S. Cl. 179—18 GF **10 Claims**



1. A telephone private switching equipment comprising a plurality of subscriber's line circuits, a plurality of external network line connecting circuits, an intercommunication routing matrix for selective interconnection of the circuits of the said pluralities, said matrix being made of rows and columns having controllable electronic switch cross-points, and a logical control unit including means for ensuring a cyclical scanning of the free, occupied and communication request conditions of the circuits of the said pluralities and means responsive to communication request conditions detected in said circuits for controlling selective activations of electronic cross-points of the matrix performing the establishment of the requested communications, wherein:

each column of the matrix comprises only a single conversation conductor and a single point activation conductor,

each row of the matrix comprises only a single conversation conductor and a single cross-point activation conductor,

each cross-point of the matrix comprises a single electronic switch member connected across the conversation conductors of a row and a column and having a trigger terminal connected by unidirectional leads to the cross-point activation conductors of said row and said column,

each subscriber's line circuit and each external network line connecting circuit includes a two-wire to one-wire conversation converter having its one-wire terminal connected to the conversation conductor of a row in the matrix,

each subscriber's line circuit includes means for periodically applying pulses to the cross-point activation conductor of the row to which it is connected, and,

each column of the matrix is controlled from a cross-point selection control unit having first and second terminals respectively connected to the cross-point activation conductor and to the conversation conductor of the column, and including means for applying cross-point activation pulses to the first terminal, means for applying to said second terminal tone and switch bias electrical currents and means for applying to said second terminal in activated condition of a cross-point of the column a unidirectional constant voltage electrical current the path of which closes in the subscriber's line circuit.

4,088,841

TELECOMMUNICATION SYSTEMS WITH CAPTIVE CONDITION SURVEILLANCE AND RELEASE

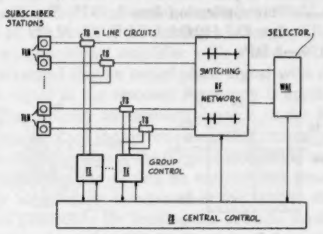
Günther Weisigk, Birmensdorf; Eugen Rippstein, Aesch, and Eugen Musterle, Zumikon, all of Switzerland, assignors to Siemens-Albis Aktiengesellschaft, Zurich, Switzerland

Filed Sep. 7, 1976, Ser. No. 720,933

Claims priority, application Switzerland, Sep. 16, 1975, 011986/75; Germany, Jul. 2, 1976, 2629852

Int. Cl.[2] H04Q *3/28*

U.S. Cl. 179—18 FG **31 Claims**



1. In a telecommunication system wherein subscriber stations with line circuits are selectively connected and controlled by an exchange having a central control and have operating conditions varying from an idle to a start condition and from a captive to the idle condition, the improvement comprising in combination:

means common and connected to the subscriber stations for monitoring the subscriber stations for a transfer from the idle to the start condition and for a transfer from the captive to the idle condition;

means for each subscriber station for generating starting signals in response to a variation from an idle to a start condition and in response to a variation from a captive to the idle condition of the particular subscriber station;

means connected to said starting signal generating means and to said common monitoring means for starting in response to each starting signal said monitoring of the subscriber stations by the common monitoring means;

means common to the subscriber stations and connected to the monitoring means for issuing a request to the central control for the establishment of a connection for a subscriber station for which a transfer from the idle to the start condition has been ascertained; and

means common to the subscriber stations and connected to the monitoring means for releasing from the captive condition a subscriber station for which a transfer from the captive to the idle condition has been ascertained.

4,088,842

AUTOMATIC COORDINATE DETERMINING DEVICE

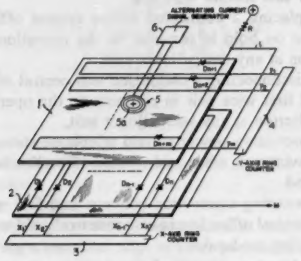
Tsuneo Ikedo, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed May 21, 1976, Ser. No. 688,835

Claims priority, application Japan, May 23, 1975, 50-62191; May 28, 1975, 50-64470; Nov. 17, 1975, 50-138002; Feb. 10, 1976, 51-13594

Int. Cl.[2] H04N *1/00*; G08C *21/00*

U.S. Cl. 178—19 22 Claims



1. An automatic coordinate determining device, comprising: a coordinate tablet having a plurality of separate parallel spaced conductive lines defining a coordinate of a coordinate system thereon; scanning signal generating means for generating successive scanning signals in response to counting signals generated therein and for successively applying the scanning signals to successive ones of said conductive lines; a probe positionable relative to said coordinate tablet at a coordinate position and having inductive windings for inductively coupling with said conductive lines; an oscillatory signal generator for generating an oscillatory signal; means for applying the oscillatory signal to a respective one of said inductive windings or said conductive lines for inducing an oscillatory signal in the other; maximum-signal detecting means for detecting the maximum induced signal successively induced during the successive application of scanning signals to the conductive lines, wherein said maximum-signal detecting means detects the amplitude of successive induced signals to determine when an amplitude of the induced signals decreases and designates the preceding induced signal as the maximum, and generates a detection signal in response to the maximum-signal condition detected; and means responsive to the detection signal for reading out from said scanning signal generating means a counting signal corresponding to a conductive line between which and said probe the maximum signal was induced, whereby the read out counting signal specifies a coordinate position of said probe relative to the coordinate defined by said plurality of conductive lines.

4,088,843

ELECTRONIC CURRENT FEED CIRCUIT

Alastair Stanley Rogers, and Norman Thorogood Thurlow, both of Ipswich, England, assignors to The Post Office, London, England

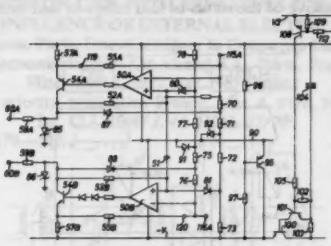
Filed Nov. 9, 1976, Ser. No. 740,087

Claims priority, application United Kingdom, Nov. 10, 1975, 46375/75

Int. Cl.[2] H04M *19/08*

U.S. Cl. 179—70 9 Claims

1. A current feed circuit for a telephone exchange transmission bridge comprising: a pair of electronic circuit elements which form a balanced network, each circuit element having one terminal for connection to a respective one of a pair of telephone lines and another terminal for connection to one terminal of an electrical power supply, each circuit element being so arranged that when connected in a transmission bridge it forms a simulated inductance and can provide a resistive path for d.c. current from the power supply to a subscriber's telephone, each circuit element including an operational amplifier having a non-inverting input, and a common capacitor connected between the operational amplifiers.



4,088,844

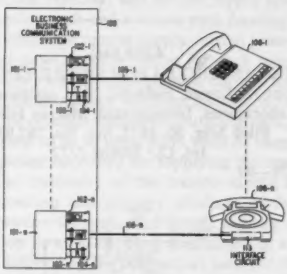
TELEPHONE STATION SET INTERFACE CIRCUIT

Richard Clyde Kinnaird, Jr., Matawan, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 21, 1976, Ser. No. 752,743

Int. Cl.[2] H04M *1/72*

U.S. Cl. 179—99 16 Claims



1. An interface circuit for use between a telephone switching system and a nonkey telephone station set wherein said telephone switching system transmits control signals to and receives status signals from each telephone station set associated with said telephone switching system over a data link independent of a speech path; wherein said interface circuit comprises:

means for terminating said data link independent of said speech path connected to said nonkey telephone station set;

means for receiving said control signals from said telephone switching system over said data link; and

means controlled by said nonkey telephone station set for transmitting said control signals back over said data link to said telephone switching system to indicate the status of said nonkey telephone station set.

4,088,845

RELAY MATRIX SWITCH

Alain Lalanne, Asnieres, and Yves Renaudin, Bougival, both of France, assignors to Societe Lannionnaise d'Electronique Sle-Citerel S.A., Lannion, France

Filed Dec. 16, 1976, Ser. No. 751,425

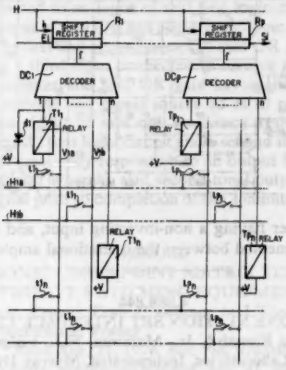
Claims priority, application France, Dec. 24, 1975, 75 39730

Int. Cl.[2] H04Q *3/00, 3/50*

U.S. Cl. 179—18 GE 10 Claims

1. A relay switch comprising: a matrix of cross-points between a set of "horizontal" inputs and a set of "vertical" outputs, a relay associated with each cross-point, each cross-point controlled by said relay associated with the cross-point, each

column of relays in said matrix controlled by a register individual to the column for storing data indicative of the relay to be operated in the column, an auxiliary memory containing data representative of the status of said relays in said matrix, and a



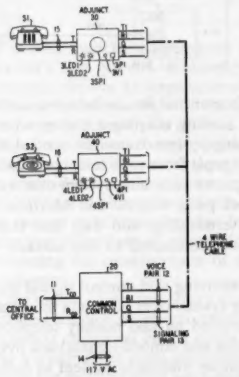
control unit, said auxiliary memory maintaining said relays in accordance with data stored therein and said control unit updating said memory in accordance with switching instructions.

4,088,846

HOLD-PLUS-INTERCOM FOR SINGLE-LINE STATIONS

James Royce McEowen, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 30, 1977, Ser. No. 782,931
Int. Cl.[2] H04M *1/72*
U.S. Cl. 179—99 **28 Claims**



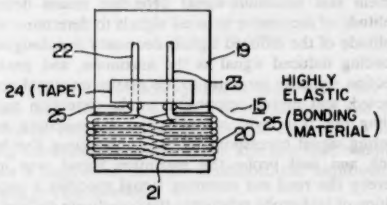
1. An intercommunication system for use with
at least two telephone stations, interconnected by a multipair cable, said cable having first and second wire pairs, and means for connecting a central office telephone line to said first wire pair, said intercommunicating system comprising:
a first adjunct unit interposed between a first said telephone station and said cable,
a second adjunct unit interposed between a second said telephone station and said cable,
each said adjunct unit including;
a momentary action pushbutton for initiating hold and intercom requests,
a speaker for paging intercom messages,
means for activating said speaker in response to the operation of said pushbutton at any said adjunct unit,
means for disabling said speaker when said associated telephone station goes off-hook, and
means for receiving system status signals over said second wire pair,
a common control unit interposed between said central office line connecting means and said cable,
said common control unit including;
means for transmitting system status signals to said adjunct units over said second wire pair,
means for placing a connected active central office telephone line on hold in response to the operation of said pushbutton at any said adjunct unit,
means for disconnecting a connected said central office line from said first wire pair in response to the operation of said pushbutton at any said adjunct unit,
means for providing power to said telephone stations over said first wire pair when said central office line is disconnected, and
means for restoring connection between said first wire pair and said central office line in response to all said telephone stations going on-hook.

4,088,847

SPEAKER VOICE COIL CONSTRUCTION

Sadao Yukimoto, Neyagawa, and Tadayoshi Ishihara, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 6, 1976, Ser. No. 748,137
Claims priority, application Japan, Apr. 7, 1976, 51-39536; Dec. 11, 1975, 50-167786[U]; Jan. 13, 1976, 51-2853[U]
Int. Cl.[2] H04R *9/04*
U.S. Cl. 179—115.5 VC **6 Claims**



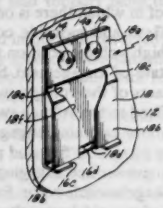
1. A speaker comprising
means for generating a magnetic field, said means having a gap therein,
a voice coil assembly located within said gap, said voice coil assembly including
a bobbin having a longitudinal axis,
a first layer of insulation-covered wire pressure-wound on a portion of the outer periphery of said bobbin,
a second layer of insulation-covered wire pressure-wound on said first layer of wire, said second layer of wire being located on and between adjacent turns of said first layer of wire, a major portion of each turn of said first and second layers of wire extending in a plane perpendicular to said longitudinal axis and the remaining portion thereof extending in a direction which is oblique to said plane, and
means for bonding the ends of said wire to said bobbin, and
a diaphragm coupled to said voice coil assembly.

4,088,848

HOLDER FOR MICROPHONES AND THE LIKE

Howard S. Weed, 2337 S. Manchester, Anaheim, Calif. 92802

Filed Feb. 28, 1977, Ser. No. 772,667
Int. Cl.[2] H04M 1/04
U.S. Cl. 179—146 R 6 Claims



1. A holder for microphones and the like comprising in combination,

a ledge member,

and a spring member fixed relative to said ledge member having a marginal edge in close proximity thereto,

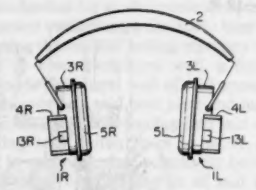
said spring member being further formed with a slot extending through said marginal edge and adapted to receive a mounting button of a microphone, said button being held against said ledge member by gravity and said spring member until said marginal edge of said spring member is pulled away from said ledge member.

4,088,849

HEADPHONE UNIT INCORPORATING MICROPHONES FOR BINAURAL RECORDING

Nobuo Usami, and Taira Kato, both of Yokohama, Japan, assignors to Victot Company of Japan, Limited, Japan

Filed Sep. 23, 1976, Ser. No. 725,712
Claims priority, application Japan, Sep. 30, 1975, 50-133368[U]; Jun. 28, 1976, 51-84865[U]; Jun. 28, 1976, 51-84866[U]; Jun. 28, 1976, 51-84867[U]; Jun. 29, 1976, 51-85326[U]; Jun. 29, 1976, 51-85327[U]
Int. Cl.[2] H04M 1/05; H04R 5/00
U.S. Cl. 179—156 R 12 Claims



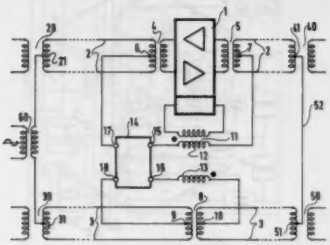
1. Apparatus having a pair of baffle plates, a pair of loudspeakers each mounted on a respective baffle plate and a pair of enclosures, each loudspeaker encased within a respective enclosure, a strap interconnecting the enclosures for holding the loudspeakers in positions adjacent to the ears of a wearer, the improvement wherein each of said enclosures is formed with a portion having a generally semicylindrical surface to simulate a human earlap in shape and dimensions, a flat surface parallel to said baffle plate remote from the ear of said wearer and defined by the semicylindrical surface and the peripheral edge of said enclosure and normal to the semicylindrical surface, and a depression in said flat surface to simulate a human ear canal, and a microphone mounted on said flat surface adjacent to said depression.

4,088,850

REMOTE SUPPLY SYSTEM FOR A CABLE TRANSMISSION LINE WITH REPEATERS SUBJECTED TO THE INFLUENCE OF EXTERNAL ELECTRIC FIELDS

Rene Migeon, Paris, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel S.A., Paris, France

Filed Mar. 4, 1977, Ser. No. 774,562
Claims priority, application France, Mar. 4, 1976, 76 06174
Int. Cl.[2] H04B 3/44; H04L 25/20
U.S. Cl. 179—170 J 3 Claims



1. A remote supply system for remote AC power supply of the repeaters of a transmission line, said transmission line including at least one repeater, said remote supply system comprising: an outgoing path and a return path forming a remote supply loop in which the remote supply current passes through the line, a local power supply circuit for each repeater, said local power supply circuit comprising a current transformer having two identical primary windings inserted in the remote supply loop at the repeater, one on the outgoing path, the other on the return path so as to draw from each of them in equal quantities the power necessary for supplying the repeater and for ensuring the continuity of the remote supply loop, and means for connecting said primary windings of the current transformer between the ends of different sections of the remote supply loop so as to exchange the outgoing and return path functions fulfilled by the conductors used for the remote supply loop.

4,088,851

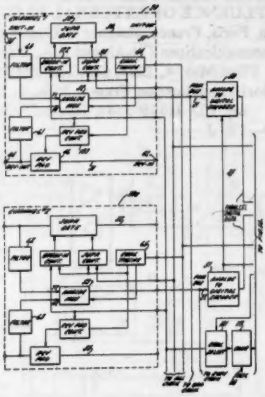
DIGITAL ECHO SUPPRESSOR

Shanti S. Gupta, Naperville; Vijaya K. Bhatnagar, Bolingbrook, and John F. Litster, Naperville, all of Ill., assignors to Wescom, Inc., Downers Grove, Ill.

Filed Apr. 28, 1976, Ser. No. 681,055
Int. Cl.[2] H04B 3/20
U.S. Cl. 179—170.2 26 Claims

1. A multi-channel digital echo suppressor for use with a plurality of paired transmit and receive lines comprising: suppression controllers and break-in controllers associated with the respective channels, means for producing a sequence of digital words indicating the absolute values of the signals on each of the lines, accumulating means for accumulating a plurality of digital words for each line, said accumulating means so constructed and arranged as to recirculate the accumulated digital words while keeping said accumulated words for the different lines interleaved but separate, means for segregating the accumulated receive line digital words from the accumulated transmit line digital words and bringing the words for the paired lines into time correlation, first comparison means responsive to the accumulated receive line words and a reference for producing suppression control signals in sequence for all of the channels, second comparison means responsive to the accumulated receive line words and the accumulated time correlated transmit line words for producing break-in control signals in sequence for all of the channels, selector means for distributing the suppression control signals and the break-in control signals to associated ones of the sup-

pression controllers and break-in controllers respectively, whereby the digitized signals are processed by common cir-



cuitry to control echo suppression and break-in in the associated channels.

4,088,852

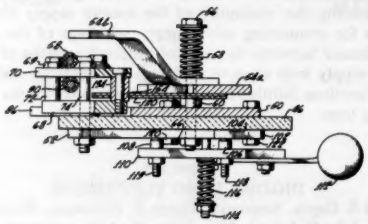
MOTOR SPEED CONTROL SWITCH ASSEMBLY

Robert L. Van Doren, Garden Grove, Calif., assignor to Taylor-Dunn Manufacturing Company, Anaheim, Calif.

Division of Ser. No. 452,384, Mar. 18, 1974, Pat. No. 4,019,386. This application Jun. 9, 1976, Ser. No. 694,095

Int. Cl.[2] H01H *9/00, 3/14*

U.S. Cl. 200—1 R **24 Claims**



9. A speed control switch mechanism for an electric motor comprising:

a mounting board,

a plurality of speed switch fixed contacts mounted on the mounting board and including at least one low speed contact, an intermediate speed contact and a high speed contact,

a speed switch rotor pivoted to the mounting board and spaced from the fixed contacts, said speed switch rotor having a movable contact fixed thereto for sequential engagement with each of said speed switch fixed contacts as the rotor is pivoted from an off position wherein the movable contact engages none of the fixed contacts, through low and intermediate speed positions to a high speed position thereof,

a cam plate fixed to the speed switch rotor, said cam plate having an arcuate cam slot formed therein having first and second end portions and an intermediate portion, means for connecting an accelerator member to said rotor for moving the rotor through and between said positions thereof,

first and second voltage switch fixed contacts fixed to the mounting board,

a voltage switch rotor on the mounting board and spaced therefrom, said voltage switch rotor having a pair of movable contacts extending therefrom toward the mounting board for selective engagement with said voltage switch fixed contacts,

said voltage switch rotor being pivotally mounted to the mounting board for movement between a low voltage position thereof in which there is one state of engagement between the fixed and movable contacts of the voltage switch and a high voltage position thereof in which there is a second state of engagement between the fixed and movable contacts of the voltage switch,

a cam follower fixed to the voltage switch rotor and extending therefrom into camming engagement within the cam slot of the cam plate, said first end portion of the cam slot having a first cam surface engaging said cam follower to move the voltage switch rotor from said high voltage position thereof to said low voltage position thereof as said speed switch rotor moves from said off position to a first low speed position, said first end portion of the cam slot including a second cam surface engaging said cam follower for driving said voltage switch rotor from said low voltage position thereof to said high voltage position thereof as said speed switch rotor moves from said low speed position to said off position,

said second end portion of said cam slot including a third surface engaging said cam follower for driving said voltage switch rotor from said low voltage position to said high voltage position thereof as said speed switch rotor moves from said intermediate speed position to said high speed position, said second end portion of said cam slot including a fourth cam surface engaging said cam follower for moving said voltage switch rotor from said high voltage position thereof to said low voltage position thereof as said speed switch rotor moves from said high speed position to said intermediate position thereof.

4,088,853

IGNITION DISTRIBUTOR-BREAKER STRUCTURE FOR INTERNAL COMBUSTION ENGINES

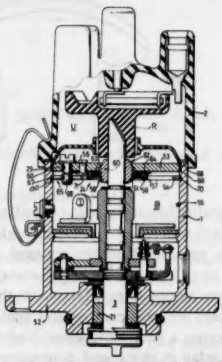
Hartmut Brammer, Vaihingen, Enz; Karl Ehrmann, Stuttgart; Jörg Issler, Stuttgart-Sud; Friedrich Jaki, Ermannshausen; Harald Kalippke, Hohenacker; Herbert Mägdefrau, Sonthofen, and Rolf Rink, Markgroningen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 3, 1976, Ser. No. 738,490

Claims priority, application Germany, Dec. 9, 1975, 2555271

Int. Cl.[2] H01H *19/00;* **F02P** *7/02*

U.S. Cl. 200—19 R **13 Claims**



1. Ignition distributor structure for multi-cylinder internal combustion engines having

a cup-shaped housing (1);

a central shaft (3) passing through the housing;

a first bearing (21) located in the bottom (52) of the housing;

a second bearing (62) axially spaced from the first bearing;
a support plate (53) extending essentially transversely of the shaft (3) and across the housing; and supporting the second bearing (62);
shoulder means (66,) formed in the inner walls (55) of the housing to provide an abutment for said support plate (53);
and means securing said support plate (53) in the housing comprising
a groove (70) formed in the inner wall (55) of the housing (1) and located axially spaced below said shoulder means (66), and forming a groove shoulder with respect to the inner wall (55) of the housing;
a snap ring (54) having a circumferential gap snapped into the groove (70) in the inner wall (55) of the housing;
and clamping screw means (28) engaging both the bearing support plate (53) and the snap ring (54) to clamp the bearing support plate to the shoulder means, and hence to the housing by clamping engagement of the bearing support plate and the snap ring with the shoulder means formed in the inner wall (55) of the housing, and, respectively, with the shoulder formed by said groove (70) into which the snap ring is snapped.

4,088,854

ELECTRONIC TIMEPIECE SWITCH MECHANISM HAVING SUBSTRATE MOUNTED PIVOTED CONTACT AND LEVER OR CAM ACTUATOR

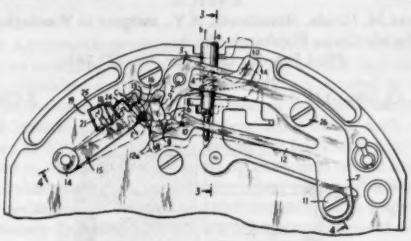
Kenji Yajima, Toda, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jul. 23, 1976, Ser. No. 708,036

Claims priority, application Japan, Jul. 24, 1975, 50-90564; Jul. 24, 1975, 50-90565; Jul. 24, 1975, 50-90566

Int. Cl.[2] H01H *19/10*

U.S. Cl. 200—6 R **7 Claims**



1. A switch mechanism for an electronic timepiece and other electronic equipment comprising a dielectric base plate having at least one opening therein and having circuitry thereon, said opening having an inner peripheral wall, a fixed electrode portion on said inner peripheral wall of said opening, a switch lever pivotally mounted on said base plate and having at least one movable contact portion extending into said opening, and means for moving said switch lever to move said contact portion parallel to said base plate selectively between an ON position in which said contact portion of said switch lever contacts said fixed electrode and an OFF position in which said contact portion of said switch lever does not contact said fixed electrode.

4,088,855

KEYBOARD ELECTRO-MECHANICAL SWITCH WITH COIL SPRING CONTACT

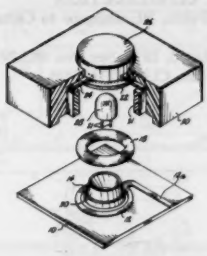
William Boyd Emery, Kirkland, Wash., assignor to Korry Manufacturing Co., Seattle, Wash.

Filed Feb. 28, 1977, Ser. No. 772,916

Int. Cl.[2] H01H *13/52, 1/06*

U.S. Cl. 200—16 A **14 Claims**

1. A snap-action electro-mechanical switch comprising a resiliently stretchable electrically conductive ring-like switch contactor, guide means movably supporting said contactor, said guide means comprising a post having a step thereon extending transversely of the post, said guide means maintaining said contactor under contractile tension looped around said post and in sliding contact therewith, actuator means engaging said contactor and operable to press the same longitudinally of the post against said step, and said contactor being complementally formed whereby force exerted by said actuator pressing the contactor against said step effects abrupt expansion of the



contactor permitting it to pass over said step with a snap action, a first switch contact means disposed adjacent to the post in position to be engaged by said contactor substantially as it passes over the step, and second switch contact means on the post in position to be engaged by the contactor with the contactor engaging the first contact means, whereby said snap action of the contactor is attended by substantially simultaneous stable electrical bridging contact between said contact means.

4,088,856

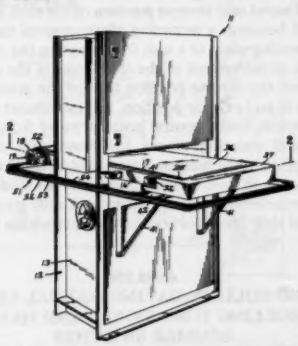
PERIMETER SAFETY SWITCH MOUNTED TO SUPPORT DISPOSED REMOTE FROM MACHINE BODY

Lloyd W. Tebben, St. Paul, Minn., assignor to Acrometal Products, Inc., Minneapolis, Minn.

Filed Jul. 1, 1976, Ser. No. 701,692

Int. Cl.[2] H01H *3/00;* B23Q *5/58;* F16P *3/12*

U.S. Cl. 200—52 R **12 Claims**



1. Safety apparatus for an electrical machine requiring an operator and having a predetermined periphery, comprising:
a. a longitudinal support member generally conforming in shape to the periphery of the machine;
b. longitudinal switch means actuatable at any point over its length, the longitudinal switch means conforming generally in length to the longitudinal support member and mounted thereto;
c. means for mounting the longitudinal support member to the machine in spaced relation to the machine periphery and outwardly remote therefrom in a position which

permits unobstructed operator accessibility to the switching means;

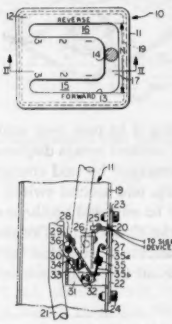
d. and electrical circuit means for interrupting electrical power to the machine in response to actuation of the longitudinal switch means.

4,088,857

BACK-UP ALARM HAVING A MODULAR CONSTRUCTION

Bruce K. McCoige, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 3, 1976, Ser. No. 682,241
Int. Cl.[2] H01H 9/06
U.S. Cl. 200—61.88 **8 Claims**



1. In a vehicle structure having a reverse operation signal device and gearshift console having a housing, a shift lever selectively positionable in forward, neutral, and reverse positions and having a portion within said housing, improved means for modifying the vehicle structure for controlling said signal device for signalling an intended reverse operation of the vehicle, comprising: means defining an opening in said housing adjacent said reverse position of the shift lever portion within said housing; a mounting plate; control means carried by the mounting plate as a unit for operating the signal device in response to movement of the shift lever in the neutral position adjacent the reverse position toward the reverse position, movement in said reverse position, and movement adjacent the reverse position in the neutral position away from the reverse position; and securing means for removably securing the mounting plate to the housing across said opening to mount the control means in said housing inwardly of said opening in accurate preselected relationship to said shift lever for actuation by said shift lever portion movements within the housing.

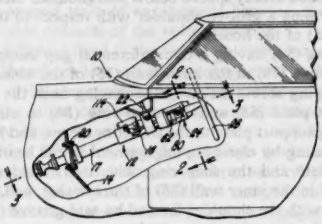
4,088,858

STEERING COLUMN HAVING MANUAL LEVER FOR CONTROLLING TURN SIGNAL AND HEADLAMP DIMMER SWITCHES

Richard L. Kramer, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 27, 1976, Ser. No. 726,761
Int. Cl.[2] H01H 3/16; G05G 11/00
U.S. Cl. 200—61.27 **4 Claims**

1. In a tilt steering column for a vehicle, jacket means forming a first portion of said steering column, a tiltable housing forming a second portion of said steering column, support means secured to said jacket means, pivot means interconnecting said housing to said support means for limited pivotal movement about an axis extending transversely of said jacket means, articulated steering shaft means extending through said jacket means and said housing, a steering wheel secured to the upper end of said steering shaft means, first switch means mounted in said housing, second switch means secured to said steering column remote from said tiltable housing, first operator means pivotally mounted to said housing for limited movement about a first axis for actuating said first switch means and second operator means mounted to said first operator means for pivotal movement about a second axis transverse to said



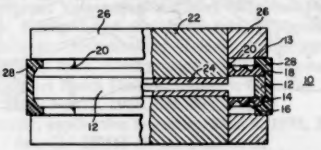
first axis, rod means interconnecting said second switch means and said second operator means, and lever means operatively connected to said second operator means and rotatable in a first direction to turn said first and second operator means so that said first operator means actuates only said first switch means and rotatable in a second direction to turn only said second operator means to activate said rod means and said second switch means.

4,088,859

NORMAL OPEN LOW VOLTAGE VACUUM SHORTING SWITCH

Robert M. Hruda, Horseheads, N.Y., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 23, 1977, Ser. No. 771,143
Int. Cl.[2] H01H 33/66
U.S. Cl. 200—144 B **5 Claims**



1. A low voltage vacuum shorting switch which is biased to be a normally open fail-safe position switch comprising:

(a) an insulative body ring;

(b) a pair of thin flexible annular members, the outer perimeter of each annular member is sealed to opposed ends of the insulative body ring, which flexible annular members are disposed generally in a direction normal to the longitudinal axis of the body ring, and wherein the annular member has a plurality of annular corrugations formed therein;

(c) a pair of cylindrical conductive support posts aligned along the insulative ring longitudinal axis, which posts pass through and are circumferentially sealed to the inner perimeter of the respective annular member through which the post passes;

(d) planar contacts disposed at each inwardly extending end of the support posts, which contacts are spaced apart within the evacuated switch when the switch is open, which contacts are brought into contact by axial relative movement of the support posts;

(e) plate-like external connection member disposed at and electrically contacting the external terminal ends of the support posts, which plate-like external connection member extends in parallel relationship to each other in a direction normal to the support post longitudinal axis and

extending in such normal direction beyond the perimeter of the flexible annular member; and

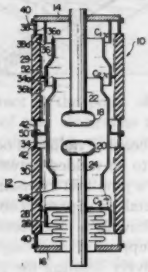
(f) an electrically insulating, resilient, elastomeric annular member disposed between the opposed spaced apart parallel disposed connection members about the body ring, with the thickness and the resilience of the elastomeric annular member such that the switch contacts are normally spaced apart in an open circuit position.

4,088,860

VACUUM INTERRUPTER FOR HIGH VOLTAGE APPLICATION

Nobuo Abe, Ibaraki, and Hiroyuki Sugawara, Hitachi, both of Japan, assignors to Hitachi, Ltd., Japan

Filed May 11, 1976, Ser. No. 685,533
Claims priority, application Japan, May 16, 1975, 50/58056
Int. Cl.[2] H01H 33/66
U.S. Cl. 200—144 B **10 Claims**



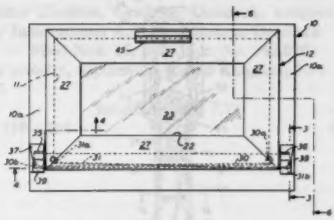
1. A vacuum interrupter for use in a vacuum breaker including: an insulating cylindrical body having at least two insulating cylindrical members with metal flanges secured to their respective ends, at least opposed ones of said metal flanges of said insulating cylindrical members being mated with each other to form said insulating cylindrical body; end plates secured to the metal flanges at the opposite ends of said insulating cylindrical body, respectively; a pair of separable stationary and movable electrodes which are secured to respective stationary and movable electrode holders and disposed within said insulating cylindrical body; a bellows positioned between said movable electrode holder and one of said end plates for moving said movable electrode in an air-tight relation; an intermediate metal shield electrically insulated from said pair of electrodes and secured to said insulating cylindrical body so as to extend inwardly of said insulating cylindrical body in surrounding relation to said electrodes for protecting said insulating cylindrical body from clinging of metal vapor or particles produced; a movable shield secured to said movable electrode holder in a manner to cover said bellows; a first cylindrical metal shield electrically insulated from and surrounds said stationary electrode holder to which said stationary electrode is secured, said first cylindrical metal shield being opposed to said intermediate metal shield and secured to a potential portion other than said intermediate metal shield; and an end cylindrical metal shield opposed to said cylindrical metal shield and secured to said end plate on the stationary electrode holder side; wherein an end portion of said first cylindrical metal shield which is opposed to one end of said intermediate metal shield, and an end portion of said end cylindrical metal shield which is opposed to the other end of said first cylindrical metal shield, each surround the corresponding end portions of said intermediate metal shield and said first cylindrical metal shield, respectively; and the diameter of said movable shield secured to said movable electrode holder is larger than the diameter of the end portion of said intermediate metal shield on the movable electrode side.

4,088,861

MICROWAVE OVEN WITH TORSION BAR HINGE

Daniel Zwillinger, New Boston, N.H., assignor to McGraw-Edison Company, Elgin, Ill.

Filed Mar. 18, 1976, Ser. No. 667,892
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 D **13 Claims**



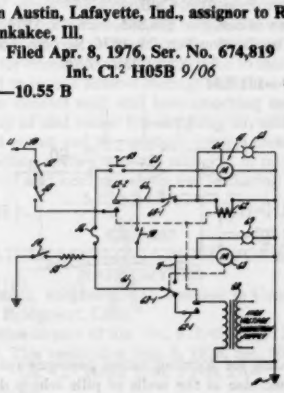
1. In a microwave oven or like appliance: the combination of a structure having a chamber therein provided with an opening at one end, a door for said opening, and a hinge support for said door comprising a pair of torsion bars running parallel with the hinged end of the door, means rigidly securing one end of each torsion bar to the inner structure of the door, said torsion bars having shaft means extending beyond opposite sides of the door at the rotational axis of the door, and bracket members in side walls of said chamber structure receiving said shaft means in non-rotational engagement therewith whereby said torsion bars are subjected to a twisting deformation as said door is swung between open and closed positions for spring-loading the door.

4,088,862

TIMER OPERATED CONTROL CIRCUIT FOR A MICROWAVE OVEN

Buddy Julian Austin, Lafayette, Ind., assignor to Roper Corporation, Kankakee, Ill.

Filed Apr. 8, 1976, Ser. No. 674,819
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 B **7 Claims**



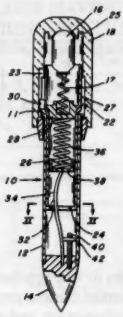
1. A control circuit for controlling a power circuit between a power supply and a microwave generator in a microwave oven, said control circuit comprising in combination, main timer means settable for a selected period for completing the power circuit for said selected period, defrost timer means selectively energizable in conjunction with said main timer and operable between open and closed conditions for periodically making and breaking said power circuit thereby to operate said microwave generator at a reduced duty cycle for said selected period, and means for automatically resetting said defrost timer to the closed condition at the end of said selected period, thereby to assure instant energization of said microwave generator on subsequent timed operations.

4,088,863

CORDLESS MEAT PROBE FOR MICROWAVE OVEN

David A. Jellies, Galesburg, Ill., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed May 20, 1977, Ser. No. 798,754
Int. Cl.[2] H05B 9/06; G01K 1/08
U.S. Cl. 219—10.55 E 8 Claims



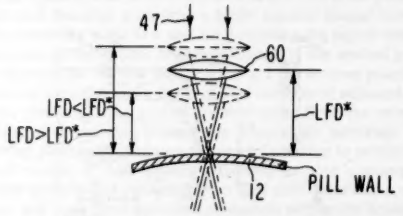
1. A probe for use in a microwave oven comprising, a generally tubular housing, temperature sensing means mounted in said tubular housing, latching means for cooperating with said sensing means, shield means fixed to said latching means, spring means for biasing said shield, and a gas-filled glass envelope mounted on said tubular housing.

4,088,864

PROCESS FOR FORMING OUTLET PASSAGEWAYS IN PILLS USING A LASER

Felix Theeuwes, Los Altos; Richard J. Saunders, San Jose, and Wayne S. Mefford, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 524,585, Nov. 18, 1974, abandoned.
This application Feb. 23, 1976, Ser. No. 660,219
Int. Cl.[2] B23K 27/00
U.S. Cl. 219—121 LM 5 Claims



1. A process for forming outlet passageways of accurate predetermined size in the walls of pills which dispense their contents by osmotically pumping said contents out said outlet passageway comprising:

(a) moving the pills in succession along a predetermined path at a predetermined velocity;

(b) tracking the moving pills seriatim at said velocity with a laser of a wavelength which is absorbable by said walls by oscillating the optical path of the laser back and forth over a predetermined section of the pill path at said velocity;

(c) firing the laser during said tracking,

(d) adjusting the laser beam dimension at said wall, the laser power and the firing duration such that the laser beam is capable of piercing the wall; and

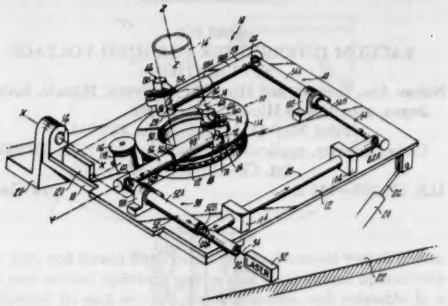
(e) forming, with the laser beam, an outlet passageway 4 to 2000 microns in diameter in the wall.

4,088,865

LASER BEAM WELDING APPARATUS

George T. Peters, Farmington, Conn.; Gorken Melikian, Springfield, Mass., and Frank R. Biancardi, South Windsor, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jan. 2, 1976, Ser. No. 646,054
Int. Cl.[2] B23K 26/00
U.S. Cl. 219—121 L 13 Claims



1. For directing a beam of radiation collimated about a fixed input axis to a joint to be welded between abutting stationary pipe lengths having a pipe axis extending at variable selected angles to the horizontal, an apparatus comprising an adjustable mounting platform having a pipe receiving opening therein, the platform being supported for swinging movement about a pivot axis for selectively locating the platform at a predetermined angular orientation to the horizontal, the mounting platform in said predetermined angular orientation to the horizontal being positioned in perpendicular relation to the pipe axis, a mirror train having an entrance, an outlet and a duct providing a passage therebetween for the beam of radiation, a focus head on the outlet mounted on the platform at a predetermined fixed radial distance from the pipe axis for movement circumferentially about the outside of the pipe joint to be welded for directing a focused output beam along a selected output axis extending in substantially perpendicular relation to the pipe axis to a focus spot on the pipe joint, the duct having upstream and downstream linear sections joined to one another at a juncture thereof, the mirror train including a reflector mounted in said juncture for redirecting the beam from a first axis extending along the upstream section of the duct to a second axis extending along its downstream section, and positioning means for moving the duct juncture and reflector therein along said first beam axis in timed relation to movement of the focus head about the pipe to effect focus head positioning relative to the pipe.

4,088,866

METHOD AND AN APPARATUS FOR AUTOMATIC ELECTRIC WELDING

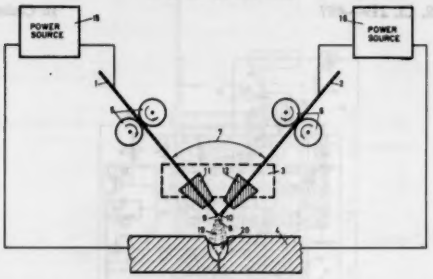
Svend Aage Lund, Birkerod; Erik Kongshavn, Farum, and Erik Ostgaard, Vaerlose, all of Denmark, assignors to Akademiet for de Tekniske Videnskaber, Svejsecentralen, Glostrup, Denmark

Continuation of Ser. No. 551,969, Feb. 21, 1975, abandoned.
This application Sep. 24, 1976, Ser. No. 726,139
Claims priority, application Denmark, Feb. 25, 1974, 1004/74
Int. Cl.[2] B23K 9/12
U.S. Cl. 219—137 R 12 Claims

1. In a method for automatic electric fusion welding of a current-carrying workpiece wherein at least two current-carrying welding electrodes are used simultaneously, the electrodes being mounted in a joint holder which is movable in relation to the workpiece, and wherein at least one of the electrodes is a continuously melting electrode movable in

relation to the joint holder by means of a feeding device, the improvement comprising:

(a) mounting and feeding said electrodes at a relative angle of between 0° and 180° in such a manner that the protruding ends of said electrodes are at least randomly in physical contact at a point of intersection where the melting of electrode material occurs, said point of intersection being substantially fixed in relation to said joint holder, whereby



the physical contact at the point of intersection of the protruding ends of said electrodes is automatically and continuously reestablished by the mounting and feeding of said electrodes; and

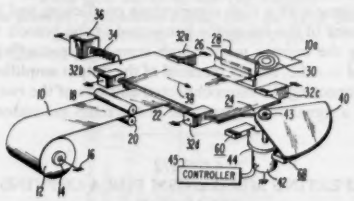
(b) applying an electric potential between each of said electrodes and said work piece so that current flows through the point of intersection of said protruding ends of said electrodes and said workpiece, whereby a joint arc is established between said electrodes and said workpiece.

4,088,867

CREATING A CLOSED IMAGE FROM SEGMENTS

Martin Lewis Levene, Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sep. 29, 1976, Ser. No. 727,658
Int. Cl.² H05B *1/00*
U.S. Cl. 219—216 **10 Claims**



1. Apparatus for forming a closed image on a record medium, said record medium being of the type that is responsive to stimulating elements of predetermined form for forming images thereon corresponding to the form of said elements, comprising in combination:

a support means;

means comprising a first group and a second group, each group comprising a plurality of selectable stimulating elements nested one within another, an element of the first group forming together with a corresponding element of the second group a closed image of predetermined form;

said first group of elements being disposed on a portion of said support means and said second group of elements being disposed on another portion of said support means separated from said first portion;

means for positioning said support means for positioning said first group of elements in working relationship relative to said medium and thereafter positioning said second group of elements in working relationship relative to said medium to effect the formation of an image on said medium corresponding to selected ones of said elements; and

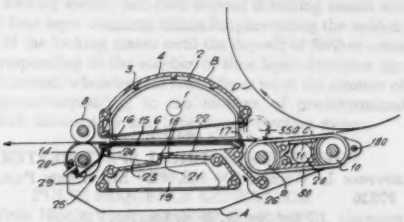
means for stimulating at least one of said corresponding elements of said first and second group while in said working relationship.

4,088,868

FUSER COOLING SYSTEM

Karl Gustav Zeuthen, Gentofte, Denmark, assignor to Rex-Rotary International A.S., Copenhagen, Denmark

Filed Nov. 15, 1976, Ser. No. 742,070
Claims priority, application United Kingdom, Nov. 17, 1975, 47288/75
Int. Cl.² H05B *1/00*
U.S. Cl. 219—216 **10 Claims**



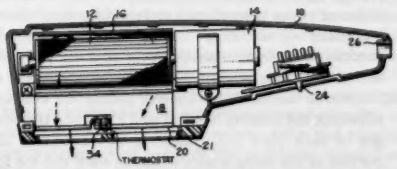
1. A fuser for an electrostatic copier, comprising a fuser bed; means for advancing over said bed a sheet bearing an unfused image; a radiant heat source above said fuser bed; a reflector disposed above said heat source and arranged to direct radiation from said heat source towards said fuser bed for fusing a delicate toner image on a sheet of copy paper being passed over said fuser bed by said advancing means in use of the fuser; heat-absorbing and -radiating means disposed in said fuser bed; means for admitting air to said fuser bed below the said heat-radiating and -absorbing means; a cooling air port just below said heat-absorbing and -radiating means; an outlet passage from said fuser bed in communication with said cooling air port; means for connecting a suction source to said outlet from the fuser bed to induce airflow through said fuser bed directly below and in contact with said heat-absorbing and -radiating means by way of said means for admitting air, said cooling air port and said outlet; and thermostatic control means for throttling said cooling airflow through said port in response to the temperature of said heat-absorbing and -radiating means.

4,088,869

TEMPERATURE LIMITING CIRCUIT FOR ELECTRIC HAIR DRYERS

Esko J. Nopanen, Asheboro, N.C., assignor to General Electric Company, Bridgeport, Conn.

Continuation-in-part of Ser. No. 572,454, Apr. 28, 1975, abandoned. This application Sep. 8, 1975, Ser. No. 610,977
Int. Cl.² H05B *1/02*; F24H *3/04*
U.S. Cl. 219—364 **3 Claims**



1. In a hairdryer of the type including a casing having an air inlet and an air exit defining an exit plane, a motor driven fan for propelling air between said air inlet and said air exit, a

heater box in said casing, said heater box including an exit opening, plural wattage heating elements comprising high and low wattage heating elements in electrical circuit disposed in said heater box for heating air to selected temperature for discharge through the air exit of said casing and thermostat means in said airstream downstream of said heating elements for sensing the air temperature and opening the electrical circuit to at least some of said heating elements upon sensing an over temperature condition, the improvement comprising:

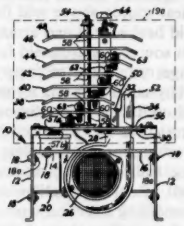
said thermostat means being positioned across the entire exit plane of said casing and disposed substantially in said exit plane of said casing and in electrical series circuit with at least some of said heating elements.

4,088,870

PORTABLE ELECTRICAL SPACE HEATER

Lawrence L. Warner, 804 NE. "D" St., Grants Pass, Oreg. 97526

Filed Sep. 1, 1976, Ser. No. 719,569
Int. Cl.[2] H05B *3/00*; F24H *3/04*
U.S. Cl. 219—367 **6 Claims**



1. A portable, electrical space heater comprising, in combination,

(a) an electric fan having an upwardly directed discharge throat, a casing having an open bottom, closed top, side and rear walls and a screened front air discharge, the discharge throat of the fan being arranged to deliver air into only the rear portion of the casing,

(b) a series of generally horizontal, vertically spaced air deflecting plates of progressively increasing front to rear width within the casing from bottom to top, the front margins of said plates terminating rearwardly of said front screened air discharge, each overlying plate having its rear margin disposed to project rearwardly beyond the rear margin of its underlying neighbor and shaped to intercept a portion of the rising air stream from said discharge throat and deflect it forward for flow between adjacent plates toward said screened front air discharge,

(c) a group of electrical heating elements distributed at successive levels between different adjacent pairs of plates and positioned in the air flow path therebetween, and

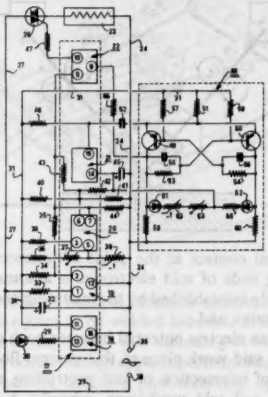
(d) common thermostatic control means for concurrently adjusting the heating level of said elements, the rear margin of each plate being inclined downward to divert a portion of the rising stream of air forward and the forward margin of each plate being inclined downward to divert forwardly traveling air downward for discharge through said front screened air discharge in a direction downwardly toward the floor.

4,088,871

POWER LIMITING DEVICE FOR AN ELECTRONICALLY CONTROLLED ELECTRIC HEATING SYSTEM

Jean-Pierre Rene Coulmance, Osny, and Jean-Claude Gerard Six, Sevres, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,363
Claims priority, application France, Mar. 26, 1975, 75 09448
Int. Cl.[2] H05B *1/02*
U.S. Cl. 219—497 **10 Claims**



1. A power limiting device for an electric heating system electronically controlled by means of a modulating thermostat of the type which comprises a direct voltage stabilizer, a zero-passage detector, a differential amplifier, a ramp generator comprising resistor means and a capacitor, and an output amplifier, the improvement being characterized in that the resistor means of the ramp generator is divided into two branches which are respectively connected to the collectors of two transistors connected as a bistable trigger circuit and with their emitters interconnected, one of said branches comprising at least a resistor with a high temperature coefficient, and in that the collector of the transistor connected to the branch which comprises the resistor with a high temperature coefficient is connected to a d.c. supply terminal of the output amplifier, and means connecting the interconnected emitters of the two transistors to a signal output terminal of the ramp generator.

4,088,872

REPEATING MECHANISM FOR A COPYING APPARATUS

Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Hiroyuki Hattori, Mitaka; Toshihide Iida, Tokyo; Koichi Miyamoto, Tokyo, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 581,546, May 28, 1975, Pat. No. 4,013,359, which is a continuation of Ser. No. 413,221, Nov. 6, 1973, abandoned, which is a division of Ser. No. 258,820, Jun. 1, 1972, Pat. No. 3,804,512. This application Nov. 6, 1975, Ser. No. 629,672
Claims priority, application Japan, Jun. 9, 1971, 46-48632[U]; Jun. 3, 1971, 46-38917; Jun. 3, 1971, 46-38918; Jun. 10, 1971, 46-41195; Jun. 10, 1971, 46-41196; Jun. 10, 1971, 46-41197
Int. Cl.[2] G06M *3/02*; G06F *15/18*
U.S. Cl. 235—91 R **2 Claims**

1. A counting device comprising:

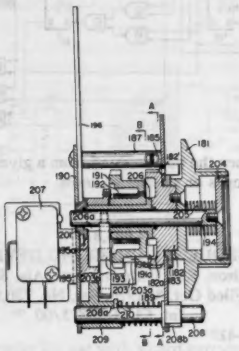
a click wheel operative integrally with a dial for setting a number of repetitive operations to be performed, said click wheel having teeth therearound the number of which corresponds to the number of repetitive operations;

a ratchet wheel having a projection thereon, said ratchet

wheel being rotated to a starting position thereof by rotation of said click wheel;

a start button, integrally formed with a center shaft and a rotation preventing member, for actuation to start said repetitive operations;

a feeding pawl for feeding said ratchet wheel in response to an external signal for every operation; and



means for preventing said ratchet wheel from returning in a reverse direction, wherein said rotation preventing member is engageable with said preventing means, and wherein said preventing means includes means for locking said start button in its said actuated position, said preventing means being releasable in response to engagement by said ratchet wheel projection to thereby release said start button upon completion of the set number of repetitive operations.

4,088,873

RENTAL TIME CONTROL SYSTEM IN COIN-OPERATED LOCKER

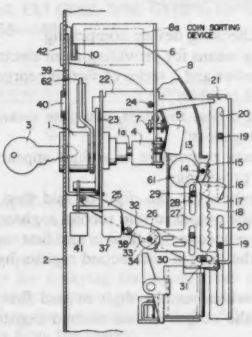
Yoshio Kinoshita, and Masayuki Iguchi, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan

Filed Oct. 26, 1976, Ser. No. 735,405

Claims priority, application Japan, Oct. 24, 1975, 50-128676

Int. Cl.[2] G06M *3/02*; G07D *9/00*

U.S. Cl. 235—92 AC **5 Claims**



1. In a locker having a coin controlled key activated locking means for enabling the locker to be opened, closed and locked, a rental time control system comprising:

a start of use detecting means associated with the locker for detecting the start of the use of the locker;

a key insertion detecting means connected to the locking means for detecting the insertion and withdrawal of a key in the locking means;

a time lapse detecting means connected to said key insertion detecting means and said start of use detecting means for detecting the lapse of time from the detection of the start of the use of the locker, for producing a time lapse detection signal whenever a predetermined period of time passes and for suspending operation upon the detection of the insertion of a key;

a rental fee setting means connected to the locking means and said time lapse detecting means having a coin deposit detecting means for detecting the deposit of a coin, a locking inhibiting means connected to the locking means and said coin deposit detecting means for preventing the locking of the locking means until the deposit of an initial coin, a time lapse counting means connected to said time lapse detecting means for counting the number of time lapse detection signals produced by said time lapse detecting means and an unlocking inhibiting means connected to the locking means, said coin deposit detecting means and said time lapse counting means for preventing the unlocking of the locking means until the deposit of further coins corresponding to the number of time lapse detection signals couted, whereby said rental fee is set at the number of coins corresponding to the number of predetermined periods detected by said time lapse detecting means.

4,088,874

PULSE SEQUENCE GENERATOR

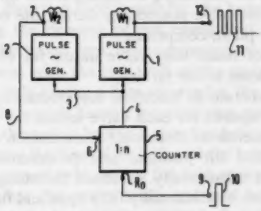
Gunter Fritz Hartig, Hansastrasse 29, Karlsruhe 21, Germany (D-7500)

Filed Jun. 24, 1976, Ser. No. 699,600

Claims priority, application Switzerland, Jul. 2, 1975, 8605/75; Germany, Jul. 18, 1975, 2532267

Int. Cl.[2] H03K *21/36*

U.S. Cl. 235—92 DE **23 Claims**



1. A pulse sequence generator for the production of pulse sequences whose pulse count depends on a geometric value, said pulse sequence generator comprising: a first pulse generator having an output and an enabling input, a second pulse generator having an output and an enabling input, and a counter having a counting output and a counting input and connected with said first and second pulse generators, said first and second pulse generators being generators providing a first pulse frequency f_1 and a second pulse frequency f_2 at the respective outputs thereof the output of said first pulse generator exhibiting the first pulse frequency f_1 forming the output of said pulse sequence generator, and the output of said second pulse generator exhibiting the second pulse frequency f_2 being directly coupled to the counting input of said counter, the counting output of said counter being connected with the enabling inputs of said first and second pulse generators so that the time of operation of said pulse generators is controlled by said counter, the frequency of each of said pulse generators being variable by at least one switching element, each switching element being provided with an actuation element rotatable or displaceable as a function of said geometric value and varying the frequency determining value of the switching element so that by the rotation or displacement of the actuation element the ratio of the frequency of said first pulse generator to the frequency of said second pulse generator is varied, each said switching element including at least one coil, and each said actuation element comprises a core which can be rotated or

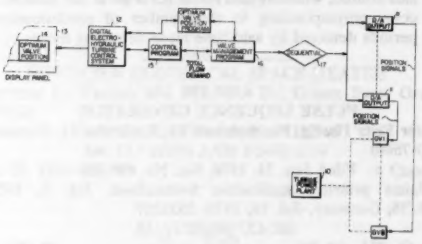
displaced as a function of said geometric value, whereby the inductivity of the coils is varied as a function of said geometric value said coils having a common core which is arranged so that upon its rotation or displacement in a predetermined range, the variation of the inductivities of the coils takes place in opposite directions, the inductivity of one coil is increased and simultaneously the inductivity of the other coil is reduced.

4,088,875

OPTIMUM SEQUENTIAL VALVE POSITION INDICATION SYSTEM FOR TURBINE POWER PLANT

Leaman B. Podolsky, Wilmington, Del.; Charles L. Groves, Jr., Willingboro Township, Burlington County, N.J., and Steven J. Johnson, Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 4, 1975, Ser. No. 628,629
Int. Cl.[2] F01D *17/00*
U.S. Cl. 364—494 **17 Claims**



1. A system for indicating minimum steam throttling losses due to optimum valve positioning during the operation of a turbine power plant, comprising

a plurality of steam inlet valve means for controlling the flow of steam to the turbine,

means to generate an electrical representation of valve lift position required for each valve means,

means to generate an electrical representation of a predetermined valve lift position, said predetermined position being at a substantially minimum throttling lift position intermediate a substantially fully open and fully closed lift position,

means to compare the generated required valve lift position representation with the generated predetermined valve lift position for each of the valve means,

detection means effective when actuated to indicate the optimum position of the plurality of valve means, and

means governed by the comparison means and the generated electrical representation of required valve lift position to activate the detection means at times when the valve means are controlled to the substantially closed position, substantially open position, or the predetermined intermediate position only.

4,088,876

ERROR CORRECTING CIRCUITS AND METHODS FOR SHIFT REGISTER TYPE MEMORIES

Satish Laxmanrao Rege, Somerset, N.J., assignor to Burroughs Corporation, Detroit, Mich.

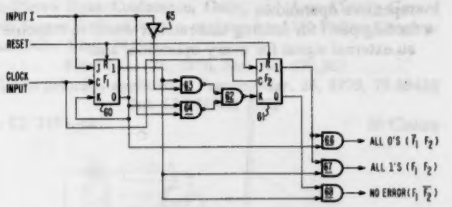
Filed Dec. 17, 1976, Ser. No. 751,597
Int. Cl.[2] G11C *29/00*
U.S. Cl. 235—312 **9 Claims**

1. A recirculating memory system comprising:

a plurality of recirculating data paths in which sets of related data bits, one bit in each of the respective paths, are recirculated in synchronism;

means coupled to the respective recirculating data paths to access a set of related bits in parallel; and

a plurality of error detecting circuits, one for each recirculating data path and coupled to said accessing means to



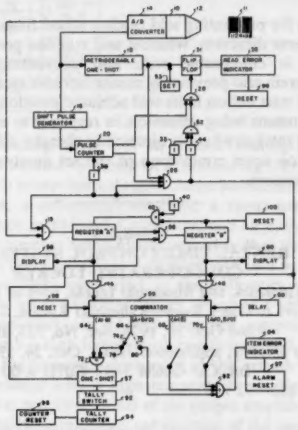
detect when the bits accessed from a given data path are a series of ones or a series of zeros.

4,088,877

SEQUENCE CHECKING DEVICE

William J. Wilson, Rte. 1, Brownsboro, Ala. 35741

Filed Oct. 8, 1976, Ser. No. 730,964
Int. Cl.[2] G06K *5/00*
U.S. Cl. 235—419 **7 Claims**



1. A sequence checking device comprising:

bar code reading means for providing as an electrical output a selected number and a series of signals representative of a bar encoded number;

first and second digital registers, and gate means interconnecting said registers;

comparator means responsive to a digit appearing in said registers and providing:

a first output whenever the digit in said first register is smaller than the output in said second register,

a second output whenever the digit in said first register is not greater than the digit in said second register by a selected value, and

a third output whenever the digit in said first register is greater than the output in said second register by a selected value;

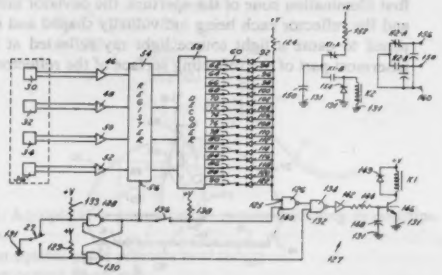
alarm means responsive to the presence of one of said outputs for indicating an error state; and

means responsive to said third output for providing a gating pulse to said gate means, whereby after a successful comparison between said registers wherein the digit in said first register exceeds the digit in said second register by said selected amount, said gate means is enabled, gating the then digit in said first register to said second register preparatory to the taking of a next reading.

4,088,878
STATIC CARD READER HAVING MULTIPLE SELECTABLE CODES

Donald S. Schasser, Pinckney, Mich., assignor to Automatic Parking Devices, Inc., Farming, Mich.

Filed Aug. 5, 1976, Ser. No. 711,851
Int. Cl.² G06K 7/00
U.S. Cl. 235—436 **10 Claims**

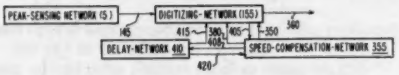


1. In a card reader for use with a card carrying indicia readable in the form of a binary code at preselected locations thereon, and including means providing a slot for receiving a card and means positioned at preselected locations adjacent said slot and responsive to indicia on a card inserted into said slot for providing a binary coded signal as a function of such indicia, the improvement comprising decoder means for decoding said binary coded signal to provide a plurality of decoded signals each indicative of a selected value of said binary coded signal, output means for providing a reader output in response to a code signal, and means for connecting any selected number of said plurality of decoded signals to a first input of said output means for providing said code signal such that said reader output signal is at one time selectively responsive to any one or more of said plurality of decoded signals.

4,088,879
CREDIT CARD READER AMPLIFIER

Eugene F. Banka, Livonia, and Roger F. Thompson, Fenton, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Aug. 4, 1975, Ser. No. 601,667
Int. Cl.² G06K 7/08; G11B 5/09; G06K 7/10
U.S. Cl. 235—449 **37 Claims**



1. An amplifier system operative to receive a signal from an encoded card reader for differentially obtaining data clock components from the read signal over a broad band of signal speeds, comprising:

a. means for delaying the signal from the reader and for producing a square wave signal whose transitions correspond to the intersections of the delayed and undelayed signals from the reader;

b. means for delaying the signal from said squaring means and for gating the delayed and undelayed signals from said squaring means to obtain, upon the non-concurrent receipt of either, a digital signal;

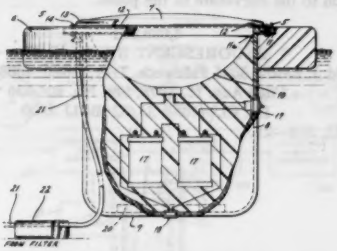
c. means initiated by the clock component of the digital signal from said digitizing means for producing a signal whose period is compensated by the speed of the digital signal to be proportional to a predetermined time frame in which probabilistically the data component of the digital signal may occur wherein said signal rate compensation means includes an adjustment circuit means for adjusting the period of the compensated signal over a plurality of clock periods; and

d. gating means responsive to the concurrent receipt of signals from said speed compensation means and said digitizing means for producing a signal indicative that the digital signal from said digitizing means is a data component.

4,088,880
DECORATIVE FOUNTAIN

Glenn Walsh, 2907 Ashley Rd., Huntingdon Valley, Pa. 19006

Filed Mar. 17, 1976, Ser. No. 667,910
Int. Cl.² F21P 7/00
U.S. Cl. 362—96 **6 Claims**



1. A lighted fountain comprising a casing having side and bottom walls and having an upwardly presented opening, a light source comprising a sealed beam electric light bulb, with a broad lens directing light upwardly, the broad lens substantially closing the opening of the casing and the peripheral portion of the broad lens being mounted on and having a waterproof seal with the side wall of the casing around said opening, the bulb having a base received in the opening of the casing, a rechargeable battery for supplying operating current for the bulb, the casing having a chamber below the light bulb accommodating the base of the bulb and the battery, the casing walls being imperforate except for said upwardly presented opening, so that the casing walls and said broad lens completely enclose the base portion of the bulb and the battery, a buoyant ring surrounding the upper portion of the casing, a ballast weight at the bottom of the casing chamber, a series of adjustable fountain spray nozzles spaced around the lens and directed upwardly in position to be lighted by the bulb, and water supply means for the spray nozzles including an annular water supply manifold extending around the broad lens and a flexible water supply hose communicating with the manifold.

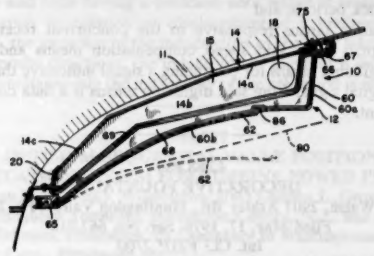
4,088,881
LIGHTING FIXTURE

Donald A. Neer, and Harold D. Pawlowski, both of Urbana, Ohio, assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Apr. 12, 1976, Ser. No. 676,221
Int. Cl.² B60Q 3/02
U.S. Cl. 362—223 **7 Claims**

1. A lighting fixture for a public transportation vehicle such as a bus, subway car or the like for supporting and back lighting translucent advertising material, comprising a housing having an internally reflective longitudinally extending back, a longitudinally extending curved light transmissive panel spaced from said back, tube-like lamp means in said housing between said back and said panel, a transparent flexible sheet positioned in overlying relation to said panel adjacent the front surface thereof for retaining sheet-type translucent advertising material between said sheet and said panel, and lever means

pivotally attaching said sheet to said panel along one longitudinal marginal edge of said sheet, and spring means biasing said



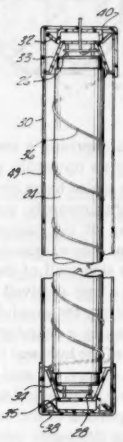
lever means to urge said sheet against said panel, in conforming relation to the curvature of the panel.

4,088,882

FLUORESCENT BIKE LAMP

Donald J. Lewis, 5086 Falmouth, Troy, Mich. 48084

Filed Aug. 12, 1975, Ser. No. 604,036
Int. Cl.[2] H05B *33/02*; B62J *5/00*
U.S. Cl. 362—217 **16 Claims**



1. A recreational light device comprising: an elongate cylindrical fluorescent bulb having end terminals; an elongate cylindrical tube of breakage-resistant light transmitting material having a length and diameter greater than those of bulb, spacer means disposed in each end of said cylindrical tube, each of said spacer means receiving a respective end of said bulb and maintaining the bulb in substantially coaxial disposition within and spaced from said tube, said spacer means being axially and radially flexible to thereby protect said bulb from impacts on said cylindrical tube and power means electrically exciting said bulb, said means including at each end of the bulb a flexible spacer having a cup-shaped body and a peripheral flange at the open end thereof, the flange being in contact with the inner surface of the tube.

4,088,883

LUMINAIRE

Thomas W. Dey, Rochester, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

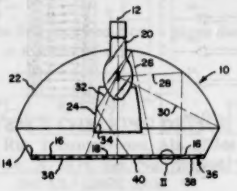
Division of Ser. No. 597,846, Jul. 21, 1975. This application May 27, 1977, Ser. No. 801,279
Int. Cl.[2] F21V *13/00*
U.S. Cl. 362—263 **2 Claims**

1. A luminaire for displaying locally unidirectional light through zones of substantially equal illumination, comprising:

a high intensity discharge light source for emitting light;

a reflector having a reflecting surface extending to a boundary substantially defining an aperture of the luminaire to reflect from the reflecting surface a portion of the light from the light source as locally unidirectional light through a first illumination zone of the aperture of the luminaire; and

deviator means disposed before the reflector for preventing the direct passage of light from said light source to the first illumination zone of the aperture, the deviator means and the reflector each being individually shaped and disposed to cause a light source light ray reflected at the innermost part of the reflecting surface of the reflector to



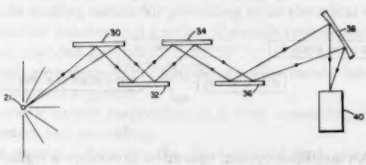
pass outward of the deviator means to be transmitted to the innermost part of the first illumination zone of the aperture and to cause a light source light ray reflected at the outermost part of the reflecting surface of the reflector means to be transmitted to the outermost part of the first illumination zone of the aperture, the deviator means being disposed to deviate light source light rays not reflected by the reflecting surface inward of the deviator means to a second illumination zone of the aperture of the luminaire, inward of the first illumination aperture zone, to provide substantially equal illumination in the first and second zones of the aperture of the luminaire.

4,088,884

WIDE APERTURE OPTICAL COMMUNICATIONS DETECTOR

Howard E. Rast, Solana Beach, and Hubert H. Caspers, La Mesa, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 26, 1976, Ser. No. 652,037
Int. Cl.[2] H04B *9/00*
U.S. Cl. 250—199 **2 Claims**



1. In an optical communication system, the combination comprising:

(a) an optical transmitter for transmitting an electro-optically modulated laser beam at a predetermined frequency;

(b) an optical receiver including housing means for receiving said modulated laser beam of energy;

(c) filter means positioned within said housing means for intercepting said optically transmitted laser beam, said filter means including fuchsine dye crystals which reflect energy of the same frequency as said modulated laser beam and which attenuates background noise outside said predetermind frequency;

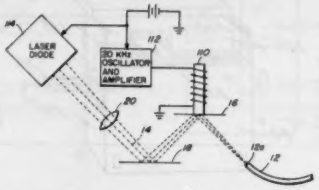
(d) detecting means positioned to intercept said reflected energy for detecting said transmitted signal.

4,088,885

METHOD AND APPARATUS FOR MODULATING AN OPTICAL SIGNAL

George J. Meslener, Acton, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jul. 26, 1976, Ser. No. 708,653
Int. Cl.[2] H04B 9/00
U.S. Cl. 250—199 3 Claims



1. An optical communication system including in combination

an optical pulse position modulator;

an optical fiber; and

an optical pulse position receiver;

said optical pulse position modulator comprising

means forming a light beam,

first and second optical deflection means for repeatedly sweeping the light beam across one end of the optical fiber to produce a plurality of optical pulses thereat, the first and second optical deflection means being serially arranged in the beam between the beam-forming means and the one end of the optical fiber to additively deflect the beam,

the first optical deflection means including a first reflective surface located in the beam path and movable to variably deflect the beam in a direction to traverse the one end of the optical fiber, and means for cyclically moving the first reflective surface at a predetermined rate to repeatedly traverse the one end of the optical fiber with the beam at predetermined times to define a plurality of reference occurrence times for the optical pulses at the one end of the optical fiber,

the second optical deflection means including a second reflective surface movable in response to a modulating signal to continuously alter the incidence of the beam on the first reflective surface of the first optical deflection means to proportionately offset each pulse at the one end of the optical fiber from its reference occurrence time by algebraically adding to the beam deflection;

said optical fiber transmitting optical pulses produced at the one end to the other end thereof;

said optical pulse position receiver comprising

converting means located adjacent to the other end of the optical fiber for converting optical pulses transmitted through the optical fiber to corresponding electrical pulses, and

decoding means coupled to the converting means for decoding the electrical pulses to reproduce the modulating signal.

4,088,886

RADIATION THICKNESS GAUGE FOR SHEET MATERIAL

Richard B. Moulton, Pittsburgh, Pa., assignor to Nucleonic Data Systems, Irvine, Calif.

Continuation of Ser. No. 615,293, Sep. 22, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,447
Int. Cl.[2] G01N 23/20
U.S. Cl. 250—277 R 8 Claims

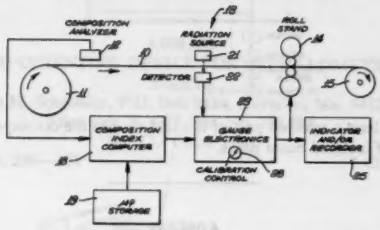
1. In a thickness measuring system for sheet material, the combination of:

an X-ray fluorescence analyzer for analyzing the composition of a metal alloy by identifying components of the alloy and indicating the amount of each component in the alloy;

means for positioning said analyzer at a sheet of the metal alloy;

a radiation thickness gauge having a radiation source, a radiation detector, and an electronics unit having said detector output as an input and providing an output varying as a function of the input from said detector, said electronics unit including calibration means for varying the relation between the output and input thereof;

means for positioning said source and detector on opposite sides of the sheet for directing radiation from said source through the sheet to said detector so that the detector output varies as a function of the thickness of the sheet;



memory means for storing mass absorption coefficient and density data for various metal alloy components;

a computer having said analyzer alloy component identification and amount output and said memory means data as inputs for calculating an output which varies as a function of the composition of the sheet at said analyzer and providing said computer output as a calibration signal for said calibration means, said computer including means for summing the products of the amount of each component of the alloy and the mass absorption coefficient and density of such component providing a total product for the metal alloy of the sheet; and

means for varying said calibration means as a function of said calibration signal.

4,088,887

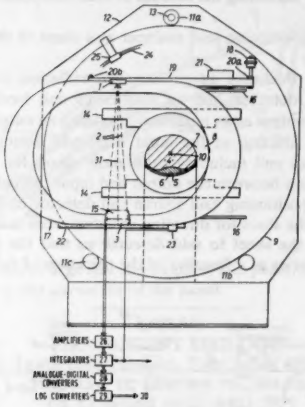
RADIOGRAPHY METHOD COMPRISING DETERMINATION OF CORRECTED ABSORPTION VALUES FOR MEMBERS OF SETS OF MUTUALLY INCLINED BEAM PATHS

Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Hayes, England

Division of Ser. No. 639,478, Dec. 10, 1975, Pat. No. 4,010,371. This application Aug. 23, 1976, Ser. No. 716,566
The portion of the term of this patent subsequent to Mar. 1, 1994, has been disclaimed.
Int. Cl.[2] A61B 6/02; G01N 23/08
U.S. Cl. 250—366 3 Claims

1. A method of examining a slice of a body by means of penetrating radiation, such as X-radiation, including the steps of: evaluating the absorption suffered by the radiation in passing through the body along a plurality of sets of mutually inclined beam paths, within the slice, each set of beam paths being oriented at a respective means angle in said slice; determining a corrected absorption value for each beam path of each set, corrected in response to the absorption values for other beam paths of the set, and distributing said corrected values to a data store representing a notional matrix of elements in the said slice, the corrected value being distributed in each case among storage locations representing elements within predetermined distances of the respective inclined beam paths, each correction being appropriate for a notional set of

parallel beam paths, having a prearranged separation of adjacent beam paths and having substantially the same distribution



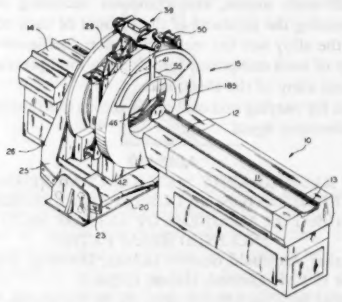
in at least a selected part of the said slice as the corresponding set of inclined beam paths.

4,088,888

GANTRY FOR COMPUTED TOMOGRAPHY

Roger Frederick Brook, Pewaukee, and Paul William Hein, New Berlin, both of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 25, 1977, Ser. No. 771,862
Int. Cl.² G03B *41/16*
U.S. Cl. 250—445 T **3 Claims**



1. X-ray tomographic apparatus comprising:

frame means and means for supporting said frame means for tilting about a laterally directed axis between opposite angles with respect to vertical,

rotatable base means supported for rotation relative to said frame means about a longitudinal axis which is perpendicular to and intersects said laterally directed axis,

x-ray source and x-ray detector means mounted on said rotatable means on opposite sides, respectively, of said longitudinal axis for jointly orbiting about an examination body which may be disposed along said longitudinal axis, and

means for tilting said frame means about said laterally directed axis, and

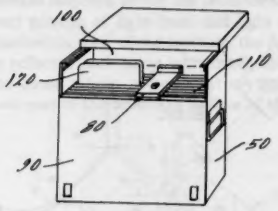
hoist means mounted to said frame means, said hoist means being constructed and arranged for enabling means which are mounted to said rotatable base to be coupled with and supported by said hoist means.

4,088,889

X-RAY FILM GUIDE

Gary Howard Meixner, Westland, Mich., assignor to Detroit Osteopathic Hospital Corp., Oak Park, Mich., a part interest

Filed Mar. 23, 1977, Ser. No. 780,470
Int. Cl.² G11B *1/00*
U.S. Cl. 250—470 **9 Claims**



1. An x-ray apparatus for taking x-rays, including a film guide for use with a film loading box on an automatic sequential x-ray machine, said film loading box being comprised of a plurality of film dividers contained within a front side, a back side, a bottom, and two opposite parallel sides of said film loading box, said film guide comprising:

a base portion which extends substantially across the width of said film loading box from said front said to said back side, and rests on top of said plurality of film dividers, and

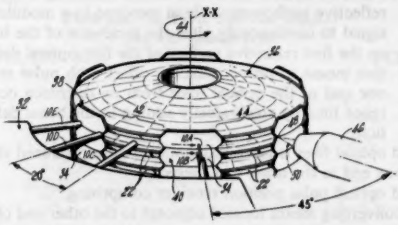
a positioning member attached to one end of said base portion which extends below said base portion and aligns and separates one of said film dividers from the adjacent side.

4,088,890

OPTICAL POSITION DETECTOR

James P. Waters, Ellington, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sep. 28, 1976, Ser. No. 727,432
Int. Cl.² G05B *1/00*
U.S. Cl. 250—202 **13 Claims**



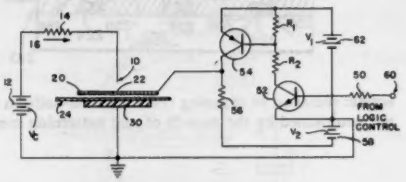
1. An apparatus for locating a seam between abutting reflective surfaces of a workpiece, the apparatus comprising an optical position detector including a photodetector and means for producing a continuous laser beam of substantially uniform intensity having a predetermined focus spot, and power operated means including a turntable for rotating the workpiece about a rotational axis with the workpiece seam being contained in a plane perpendicular to the rotational axis of the turntable, the optical position detector being movable relative to the workpiece for scanning the workpiece surface with the laser focus spot, the photodetector being positioned to receive radiation reflected from the workpiece, the photodetector producing a continuous output signal variable in relation to the intensity of said reflected radiation for indicating the position of the workpiece seam when said signal is below a predetermined threshold.

4,088,891

ELECTROSTATIC APERTURE PRINTING

R. Lowell Smith, Solon, Ohio; J. Douglas Logan, Canoga Park, and Michael P. Kendall, Chatsworth, both of Calif., assignors to Horizons Research Incorporated, Cleveland, Ohio

Filed Nov. 11, 1976, Ser. No. 740,919
Int. Cl.[2] G03G *13/00, 15/00*
U.S. Cl. 250—315 R 13 Claims



1. An electrostatic printer comprising:

a dielectric charge receiving member,

a source of ions constrained to move in the electric fields provided for their generation transport and collection;

at least one apertured mask interposed between said ion source and said dielectric charge receiving member and wherein said mask comprises at least one aperture and the same number of discrete conducting segments, and an insulating support member wherein the aperture walls of which are rendered conducting by attached through-hole conductors in order to enhance the ion transmission of the mask:

a backing electrode constituting a non-vacuum close electrical contact to the entire contact surface of said receiving member to control in cooperation with said mask or masks the flow of ions from said source to said dielectric charge receiving member;

means to transport said dielectric charge receiving member in concert with operation of a charge flow modulation means;

means for supporting and establishing an electric potential at the back side of said dielectric charge receiving member;

circuit means for introducing appropriate image structure related control voltage pulses to the modulating means;

means for toning or developing the charge image record to a visually observable state;

means for fusing or fixing the developed imagery to a stable, semipermanent operation; and

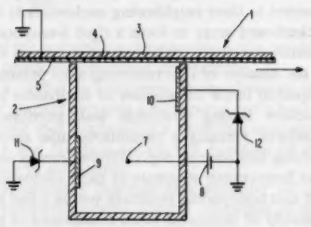
means for the ejection or delivery of the finished graphic record.

4,088,892

CORONA CHARGING APPARATUS AND METHOD

John D. Plumadore, Westfield, Mass., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Oct. 12, 1976, Ser. No. 731,210
Int. Cl.[2] H01T *19/04*
U.S. Cl. 250—325 15 Claims



1. Apparatus for electrostatically charging a moving electrophotographic film to a predetermined charge potential, comprising:

a corona discharge electrode spaced from the film and extending parallel to and across the width of the film;

high voltage potential means connected to the corona discharge electrode for producing corona current;

an electrically conductive control electrode extending parallel to and across the width of the film at a position less than ¼ inch from the film and in the direction of film movement from the corona discharge electrode;

biasing means for electrically biasing the control electrode at a potential proportional to the film predetermined charge potential, thereby limiting the maximum charge on the film to the predetermined charge potential; and

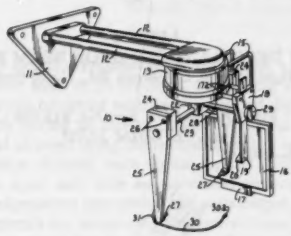
an electrically conductive corona initiating electrode extending parallel to and across the width of the film at a position closer to the corona discharge electrode than the control electrode is from the corona discharge electrode.

4,088,893

HEAD ORIENTING DEVICE FOR CEPHALOMETRIC X-RAYS

Charles H. Schroeder, P.O. Box 9414, Raytown, Mo. 64133

Filed Feb. 7, 1977, Ser. No. 765,985
Int. Cl.[2] G21K *5/08*
U.S. Cl. 250—451 9 Claims



6. In a head positioning device for use in cephalometric radiography, the combination of:

a pair of spaced apart post members supported on the device and adapted to engage opposite sides of the head;

an ear pin on at least one post member for engagement with the ear;

an indicating member having first and second end portions; and

means mounting said indicating member on said one post member for pivotal movement about a substantially vertical pivot axis between an indicating position wherein said first end portion is adapted to contact the facial area of a head positioned between the post members, and a retracted position wherein said first end portion is remote from the facial area.

4,088,894

(Ba,Sr)F, (Cl,Br) : Eu + [2] X-RAY IMAGE CONVERTERS UTILIZING LAOBR (TM,TB) PHOSPHORS

Jacob G. Rabatin, Chardon, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 13, 1976, Ser. No. 750,030
Int. Cl.[2] G01J *1/58*
U.S. Cl. 250—483 15 Claims

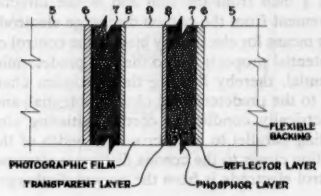
1. A physical admixture of phosphors including: a first phosphor, of well-formed relatively small particles, according to the formula:

$$LnOX:Ty$$

wherein

Ln is one or more of La and Gd;
X is one or more of Cl and Br;
Ty is one or more of Tm, Tb and is present as an activator; with a second phosphor, of relatively large particles, according to the formula:

$$Ba_{1-A-B}Sr_AEu_BFX$$



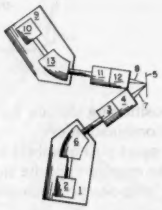
wherein
A is from about .0 to about 0.5 mole;
B is from about .005 to about 0.1 mole; and
X is one or more of Cl and Br,
the admixture resulting in improved conversion of x-rays to visible light with higher resolution and lower quantum mottle.

4,088,895

MEMORY DEVICE UTILIZING ION BEAM READOUT

Frederick Wight Martin, Colebrook Rd., North Stratford, N.H. 03590

Filed Jul. 8, 1977, Ser. No. 813,888
Int. Cl.[2] G01M *23/00*
U.S. Cl. 250—492 A **8 Claims**



1. A memory device having at least one directable focused ion beam and a substrate, wherein bits of information are stored in small sites at addresses given by the position at which the ion beam strikes the substrate, and wherein information is read out by means of the interaction of a directable focused ion beam with the substrate.

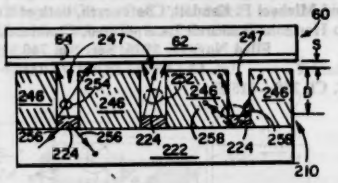
4,088,896

ACTINIC RADIATION EMISSIVE PATTERN DEFINING MASKS FOR FINE LINE LITHOGRAPHY AND LITHOGRAPHY UTILIZING SUCH MASKS

Perry E. Elkins, Santa Ana; A. Brooke Jones, La Mirada, and John P. Reekstin, Jr., Orange, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 20, 1976, Ser. No. 752,638
Int. Cl.[2] G21K *5/04*
U.S. Cl. 250—505 **10 Claims**

1. A mask for exposing radiation sensitive resist in a non-uniform, patterned manner comprising:
substrate means;
actinic radiation emissive means supported by said substrate means for emitting actinic radiation; and
patterning means disposed between said actinic radiation emissive means and the location in which a resist layer to be exposed would be located for restricting the emitted



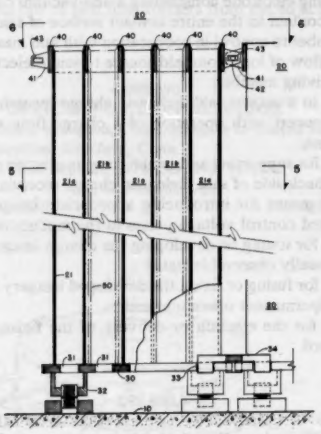
actinic radiation to exposing resist in a non-uniform manner determined by the pattern of said patterning means.

4,088,897

NUCLEAR FUEL STORAGE RACK

Olaf Soot, 9 Tomahawk Lane, Greenwich, Conn. 06830

Continuation-in-part of Ser. No. 654,475, Feb. 2, 1976, Pat. No. 4,034,227. This application Jan. 19, 1977, Ser. No. 760,687
Int. Cl.[2] G21F *5/00*
U.S. Cl. 250—507 **21 Claims**

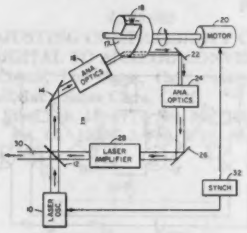


1. A nuclear fuel storage rack comprising a plurality of elongated, corner-adjoining, parallel enclosures each of generally rectangular cross-section and structural means distributed along portions of their length and permanently joining each of the enclosures to their neighboring enclosures at their corners in a checkerboard array to form a rigid honeycomb structure having transverse shear walls extending across the rack and wherein the number of fuel-receiving slots present is approximately equal to twice the number of enclosures present, each fuel enclosure having structural wall portions comprising poison material forming a continuous tube surrounding the fuel-receiving slot therein, top stiffening means secured to the top of the honeycomb structure at each enclosure, means for mounting said honeycomb structure within a fuel storage pool, and a plurality of elongated tubes constituted of poison material, one of said poison tubes being located within each of the fuel-receiving slots located between the interconnected enclosures.

4,088,898
ROTATING OPTICAL FREQUENCY CHIRP DEVICE

Malcolm Lane Stitch, Kennewick, Wash., assignor to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Filed Oct. 6, 1976, Ser. No. 729,893
Int. Cl.² H03F 7/00
U.S. Cl. 307—88.3 24 Claims



1. A method for providing a beam of electromagnetic radiation of time-varying frequency, comprising the steps of:

providing a beam of electromagnetic radiation from a source thereof;

circulating the beam of electromagnetic radiation around a closed path to define a set of distinct resonant frequencies for the radiation circulating around said path;

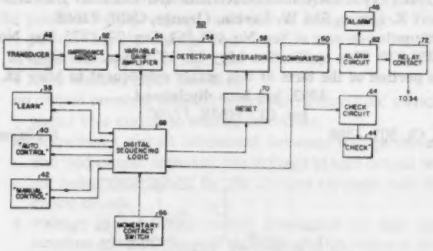
amplifying the beam of electromagnetic radiation circulating around the path; and

varying the speed of propagation of the beam of electromagnetic radiation as a function of time over a portion of the path to produce frequency variations in the distinct resonant frequencies in the beam of electromagnetic radiation circulating around the path.

4,088,899
METHOD FOR CONTROLLING AN AUTOMATIC MACHINE TOOL

Robert C. Miller, and George T. Mallick, Jr., both of Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 542,315, Jan. 20, 1975, Pat. No. 4,023,044.
This application Sep. 14, 1976, Ser. No. 723,254
Int. Cl.² G08B 23/00
U.S. Cl. 307—116 13 Claims



1. A method for controlling the operation of a machine tool performing a repetitive operation, comprising:

producing a signal in response to mechanical impulses caused by contact between a workpiece and a tool surface of a machine tool performing a repetitive operation;

generating a test function which is a function of the time dependence of said signal;

generating a reference function representative of said test function evaluated during normal operation of said machine tool;

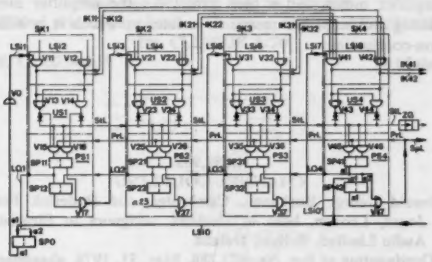
comparing said test function and said reference function; and

taking corrective action when said test function and said reference function differ by more than a predetermined amount.

4,088,900
SAFETY CIRCUIT, ESPECIALLY FOR ELEVATORS AND THE LIKE

Herbert Klopsch; Klaus Lobert, and Dietrich Stamm, all of Berlin, Germany, assignors to Inventio AG, Hergiswil NW, Switzerland

Filed May 19, 1976, Ser. No. 687,752
Claims priority, application Switzerland, May 21, 1975, 6531/75
Int. Cl.² H02J 13/00
U.S. Cl. 307—149 8 Claims



1. A safety circuit arrangement, especially for a transportation installation such as an elevator, comprising at least one switching circuit equipped with two monitored digital logical elements each having an input side and an output side, each digital logical element being connected in circuit with a separate information channel, each digital logical element is connected at its input side with an associated anti-valent signal generating information transmitter and at its output side with a monitoring circuit for monitoring the anti-valence of the output signals, a control line for switching-off the installation in the presence of equivalence, said monitoring circuit comprising a logical element connected at its ouput side with the control line, said logical element solely comprising diode means, said monitoring circuit further comprising logical elements arranged at the input side of the monitoring circuit, a testing circuit, said input side-logical elements and the monitored digital logical elements being connected in circuit with said testing circuit, said testing circuit including means which, upon placing into operation the installation, applying a test signal simulating a defect in succession to both monitored digital logical elements, and a timing element having a switching-in time-delay connected in the control line for switching-off the installation.

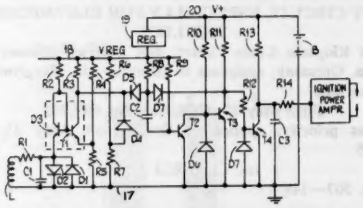
4,088,901
CIRCUIT FOR RECOGNIZING A PULSE WAVEFORM AND AN IGNITION SYSTEM FOR AN I.C. ENGINE INCLUDING SUCH A CIRCUIT

William Frank Hill, Stafford, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Nov. 11, 1975, Ser. No. 630,863
Claims priority, application United Kingdom, Nov. 21, 1974, 50452/74
Int. Cl.² H03K 5/01
U.S. Cl. 307—236 10 Claims

1. In combination, a magnetic transducer comprising an inductor and magnetic means for inducing in the inductor periodically a pulse waveform of unipolar shape approximating to a half wave sinusoid, and a recognition circuit including a capacitor and resistor in series with the inductor and forming a damped tuned circuit tuned to resonate at a frequency approximately equal to the frequency of the sinusoid to which the

pulse waveform to be recognized approximates, semi-conductor amplifier means having an input across which the capacitor is connected, coupling means coupling the tuned circuit to the



amplifier means and a bias circuit for the amplifier means biasing the amplifier means to a state in which it is almost non-conducting.

4,088,902

CHANNEL COUPLING

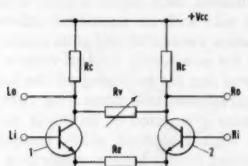
Donald George Buchanan, Cambridge, and Roderick Frank Jones, London, both of England, assignors to Strathearn Audio Limited, Belfast, Ireland

Continuation of Ser. No. 672,288, Mar. 31, 1976, abandoned. This application Aug. 11, 1977, Ser. No. 823,596

Claims priority, application United Kingdom, Apr. 2, 1975, 13483/75

Int. Cl.² H03K *17/00*

U.S. Cl. 307—241 **2 Claims**



1. A channel coupling circuit for use in controlling the coupling of signals between two separate channels including a first transistor for connection in a gain producing mode in a first channel, a second transistor for connection in a gain producing mode in a second channel, a first and a second electrode of each transistor being connected in a respective output signal current carrying path, an input terminal for each channel being connected directly to a third electrode of the transistor in that channel, an output terminal for each channel being connected directly to said first electrode of the transistor in that channel, a first impedance directly coupling said two first electrodes, a second impedance directly coupling said two second electrodes, one of said first and second impedances being variable, and a further impedance being connected to each first electrode in the respective output signal current carrying path, the relationship between the values of said first, second and further impedances determining the gains produced by said transistors between the input and output terminals in each channel and between the input terminal in one channel and the output terminal in the other channel and therefore the degree of coupling between the signals applied to the input terminals and the signals obtained from the output terminals of each channel.

4,088,903

BISTABLE CIRCUITS

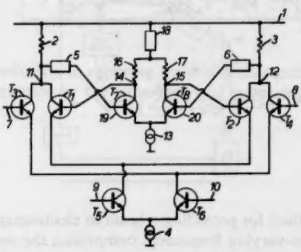
Edwin Vaughan Jones, Chelmsford, England, assignor to The Marconi Company Limited, Chelmsford, England

Filed Feb. 14, 1977, Ser. No. 768,576

Claims priority, application United Kingdom, Feb. 19, 1976, 6529/76

Int. Cl.² H03K *3/286*

U.S. Cl. 307—291 **4 Claims**



1. A bistable including first and second pairs of transistors the transistors within a pair having their collectors connected by a current path and arranged to share a current; a third pair of transistors having their emitters connected by a current path and collectors arranged to share a current; first transistors of the first and second pairs respectively having emitters connected by a current path; second transistors of the first and second pairs respectively having emitters connected by a current path; means for applying data signals to a first transistor of the first and second pairs; means for applying clock signals to switch current from a second to a first transistor of the first and second pairs in dependence upon the state of the data signals and feedback paths between the collectors of the first pair and the base of a first transistor of the third pair; between the collector of the first transistor of the third pair and the base of the second transistor of the first pair; between the collectors of the second pair and the base of the second transistor of the third pair and between the collector of the second transistor of the third pair and the base of the second transistor of the second pair.

4,088,904

CAPACITIVE TRANSISTORIZED SIGNALING DEVICE

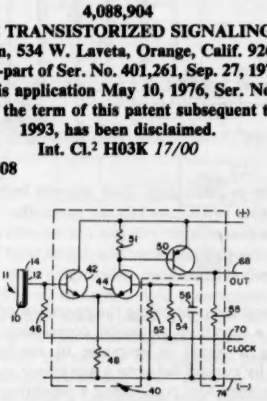
Robert E. Green, 534 W. Laveta, Orange, Calif. 92668

Continuation-in-part of Ser. No. 401,261, Sep. 27, 1973, Pat. No. 3,958,239. This application May 10, 1976, Ser. No. 684,672

The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.

Int. Cl.² H03K *17/00*

U.S. Cl. 307—308 **8 Claims**



1. A switch comprising:

a capacitive registering element having a conductive surface for purposes of acting as a capacitive element in conjunction with a second body placed in proximity thereto:

a means connected to said conductive surface for generating a signal having a sufficiently fast rise or fall time to cause

the switch to function as a slope differentiation detector with respect to the fast rise or fall time in response to the second body placed in proximity to said capacitive registering element; and,

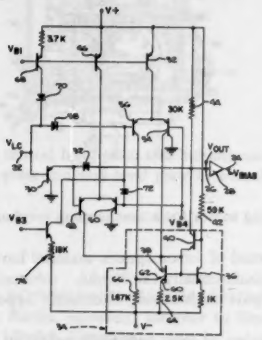
an amplifier connected to said conductive surface and said signal means having an electrical load connected thereto.

4,088,905

SELF-ADJUSTING COMPATIBILITY CIRCUIT FOR DIGITAL TO ANALOG CONVERTER

Donald T. Comer, Los Gatos, Calif., assignor to Precision Monolithics, Inc., Santa Clara, Calif.

Filed Feb. 15, 1977, Ser. No. 768,867
Int. Cl.² H03K *5/156, 5/18, 13/02*
U.S. Cl. 307—358 **20 Claims**



1. A logic compatibility circuit for interfacing a digital to analog converter having positive and negative voltage supplies with logic input signals corresponding to first and second logic systems, such that appropriate threshold switching signals compatible with each logic system are automatically presented to the converter when a logic control signal from either system is applied to the circuit, said first logic system being characterized by a logic control signal within a first voltage range and by a switching threshold which differs from the logic control signals by a fixed increment, said second logic system being characterized by a logic control signal within a second range which is higher in voltage than said first range, and by a switching threshold equal to a substantially fixed proportion of the positive supply voltage, said circuit comprising:

a positive supply voltage bus,

a negative supply voltage bus,

a logic control input terminal,

an output terminal adapted to provide a threshold switching signal to a digital to analog converter,

an impedance circuit connected between said positive bus and said output terminal, the voltage at said output terminal being determined by the current through said impedance circuit,

a voltage incrementing circuit connected to said output terminal to draw current through said impedance circuit and thereby establish an output terminal voltage, said incrementing circuit being connected to said input terminal for biasing such that the current drawn thereby establishes an output signal which differs from the input voltage by a substantially fixed incremental amount, said incrementing circuit including a threshold means adapted to terminate said current drawn when the logic control signal at said input terminal exceeds a predetermined threshold corresponding to the upper limit of said first range,

an output circuit connected to said output terminal to draw a current through said impedance circuit, the magnitude of which is directly proportional to said positive bus voltage and sufficient to satisfy the input-output voltage relationship of said second logic system, and

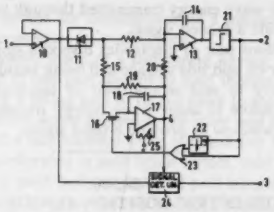
a bypass circuit adapted to divert the current drawn by said output circuit away from said impedance circuit when the logic control signal at said input terminal is less than said first range, thereby causing the output terminal voltage to be determined by said voltage incrementing circuit when the logic control voltage at said input terminal is within said first range, and by said output circuit when the logic control voltage is within said second range.

4,088,906

TRANSMISSION LEVEL INDICATOR

Josef Hüllwegen, Altenbeken, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany

Filed Sep. 30, 1976, Ser. No. 728,158
Claims priority, application Germany, Oct. 1, 1975, 2543860
Int. Cl.² H03K *5/20*
U.S. Cl. 307—359 **14 Claims**



1. A circuit arrangement for the production of a transmission level indicator signal for use with receiver means adapted to receive a transmission of data signals which are interpreted whenever the data signals exceed a predetermined transmission threshold, said circuit arrangement comprising:

an integrator;

means for applying a first direct voltage to the input of said integrator proportional to the amplitude of the received data signals; and

means for applying a second direct voltage of opposite polarity from the first voltage to the input of said integrator whereby said first and second voltages are superimposed, said second voltage being substantially in the same proportion to the first voltage as the transmission threshold, said second voltage feeding means further comprising means for storing said second voltage and switch means responsive to the integrator output for connecting the storing means with the integrator input, wherein the output of the integrator forms the transmission level indicator signal.

4,088,907

PIEZOELECTRIC ACOUSTIC EMISSION INSTRUMENTATION

Charles H. Jones, Pasadena, and George R. Douglas, Arnold, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 29, 1976, Ser. No. 736,799
Int. Cl.² H01L *41/04*
U.S. Cl. 310—333 **16 Claims**

1. Instrumentation for detection of acoustic emissions from a structure, comprising:

(A) a transducer housing adapted to be placed on said structure and having an acoustic window for transmission of acoustic energy;

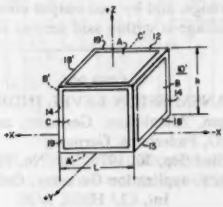
(B) a piezoelectric transducer element positioned relative to said window to be responsive to acoustic energy transmitted therethrough;

(C) said transducer element including a longitudinal axis perpendicular to said window and being poled in the same direction as said axis;

(D) said transducer element including top, bottom, and side surfaces and having

(i) a first pair of electrodes disposed on said top and bottom surfaces and being responsive to compressional wave energy transmitted through said window to provide a first signal,

(ii) a second pair of electrodes disposed opposite one



another on said side surface and being responsive to shear wave energy transmitted through said window to provide a second signal,

(iii) a third pair of electrodes disposed opposite one another on said side surface and being angularly displaced relative to said second pair of electrodes and being responsive to shear wave energy transmitted through said window to provide a third signal.

4,088,908

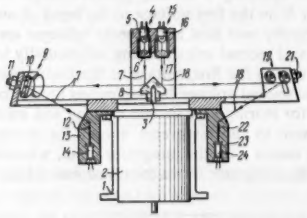
PHOTOELECTRIC POSITION SENSOR OF STEP MOTOR

Valery Fedorovich Gumen, Kirovsky prospekt, 27, kv. 112; Tatyana Vasilievna Kalininskaya, prospekt Metallistov, 21, korpus 2, kv. 98; Robert Nikolaevich Loparev, Torzhkovskaya ulitsa, 16, kv. 38, and German Vladimirovich Sladkov, ulitsa B. Podyacheskaya, 23, kv. 12, all of Leningrad, U.S.S.R.

Filed Dec. 27, 1976, Ser. No. 754,433

Int. Cl.[2] H02K *37/00*

U.S. Cl. 310—49 R **3 Claims**



1. In combination a step motor and a photoelectric position sensor, comprising: a step motor having a shaft and having a housing or shell; said photoelectric position sensor of said step motor comprising a casing secured on said shell of said step motor; a light source of said sensor located in said casing of said sensor; a light beam from said light source; a mirror pyramid of said sensor, secured on said shaft on said step motor across said light beam; faces of said mirror pyramid, reflecting said light beam; a faceted mirror reflector of said sensor, located in said casing of said sensor across said light beam reflected from a respective said face of said mirror pyramid; a group of light guides of said sensor, being secured to said casing of said sensor, and their number being determined by the ratio between the number of positions for one revolution of said step motor and the product of the number of said faces of said mirror pyramid by the number of the facets of said mirror reflector; the first ends of said light guides, being located across said light beam reflected from said respective facet of said mirror reflectors; and a photoelectric receiver being located in said casing of said sensor across said light beam emerging from the other ends of said light guides.

4,088,909

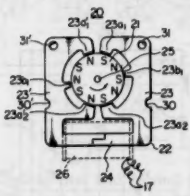
STEPPING MOTOR FOR TIMEKEEPING MECHANISM

Yasuhiro Matsumura, and Shigeki Hata, both of Omiya, Japan, assignors to Kanto Seiki Company, Limited, Omiya, Japan

Filed Feb. 18, 1977, Ser. No. 770,274

Int. Cl.[2] H02K *37/00*

U.S. Cl. 310—49 R **11 Claims**



1. A stepping motor for a timekeeping mechanism, comprising:

a rotor formed of ferromagnetic material having a plurality of circumferentially arranged, substantially equally spaced apart poles having alternately opposite polarities; and

a stator having at least two main poles, an auxiliary pole disposed in proximity to the circumference of the rotor, and a winding adapted to be energized by periodic current pulses for polarizing said main poles in opposite polarities to each other at periodic intervals, the circumferential position of each of said main poles being such that each main pole when polarized is capable of alignment with a corresponding one of the rotor poles of the opposite polarity to the polarity of said main stator pole, said auxiliary stator pole being angularly displaced from a position of alignment with another rotor pole when said main stator poles are in alignment with the corresponding rotor poles, said auxiliary stator pole having a circumferential extent smaller than a circumferential extent of each of said main stator poles.

4,088,910

GEARED MOTOR ASSEMBLY

Laverne Lawrence Frey, Delavan, Wis., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

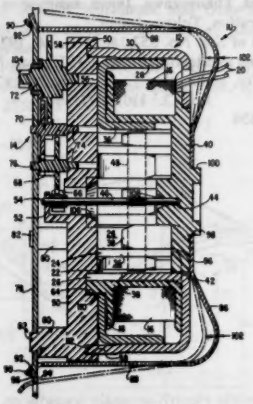
Filed Aug. 16, 1976, Ser. No. 714,565

Int. Cl.[2] H02K *5/00*

U.S. Cl. 310—89 **22 Claims**

1. A geared motor assembly comprising a field structure having first alignment extensions; a rotor; a shaft carrying said rotor; a bearing for one end of said shaft carried by said field structure; a face plate having a bearing for the opposite end of said shaft, a plurality of first alignment recesses, and at least one second alignment extension; a head plate having at least one second alignment recess; a gear reduction assembly comprising a plurality of gear elements journalled in and between said face and head plates and driven by a pinion on said shaft; said first alignment extensions being within said first alignment recesses and said second alignment extensions being within said second alignment recesses for accurately positioning said field

structure, said face plate, and said head plate with respect to each other; and a single retention member extending from said



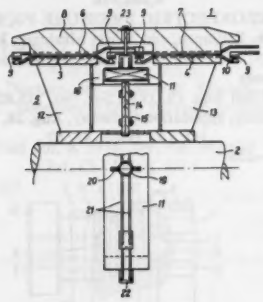
field structure to said head plate and holding said field structure, said face plate and said head plate in assembled relation.

4,088,911

ELECTRIC UNIPOLAR MACHINE

Dieter Wetzig, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 5, 1976, Ser. No. 711,865
Claims priority, application Germany, Aug. 20, 1975, 2537548
Int. Cl.[2] H02K *31/00*
U.S. Cl. 310—178 6 Claims



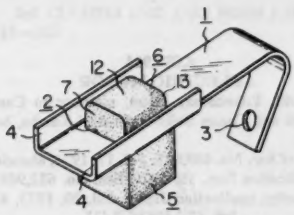
1. An electric unipolar machine comprising:
two rotating cylinders arranged one behind the other along an axial direction;
two stationary cylinders each arranged to surround one of said rotating cylinders;
sliding contacts for connecting the stationary and rotating cylinders;
a rotor hub for supporting the rotating cylinders, said hub having a central recess and being centrally divided at a point along the axial direction;
a housing for supporting the stationary cylinders, said housing being divided at a point along the circumferential direction;
a current-carrying field winding having a diameter smaller than that of said cylinders, said winding being disposed in said recess;
and means for supporting said winding.

4,088,912

BRUSH DEVICE FOR MINIATURE ELECTRIC MOTOR

Makoto Yoshida, Tokyo, Japan, assignor to Aupac Kabushiki Kaisha, Japan

Filed Aug. 27, 1976, Ser. No. 718,113
Claims priority, application Japan, Sep. 2, 1975, 50-121166[U]
Int. Cl.[2] H02K *13/00*
U.S. Cl. 310—244 11 Claims



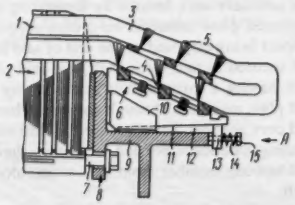
1. A brush device for commutator of a miniature electric motor which comprises in combination:
a. a brush holder made of a leafsspring having an opening perforated in one part thereof to hold therein said brush, and having a fitting part to fix the same to the main body of the electric motor formed at the other part thereof; and
b. a brush of a size adapted to be inserted and held in said opening perforated in said brush holder, said brush consisting of a main body and a head part integrally formed on said main body in a size different from said main body, and said head part being forcibly inserted into said perforated opening in said brush holder.

4,088,913

ELECTRICAL MACHINE STATOR

Igor Alexandrovich Prigorovsky, Basseinaya ulitsa, 53, kv. 4; Anatoly Denisovich Ignatiev, Basseinaya ulitsa, 85, kv. 162; Vladimir Emmanuilovich Shkolnik, Bukharestskaya ulitsa, 39, korpus 3, kv. 22; Garri Mikhailovich Khutoretsky, Altaiskaya ulitsa, 20, kv. 5, all of Leningrad; Alexandr Ivanovich Vorontsov, ulitsa Khazova, 43, kv. 94, Pushkino Leningradskoi oblasti, and Vladimir Markovich Fridman, Grazhdansky prospekt, 13, korpus 1, kv. 170, Leningrad, all of U.S.S.R.

Filed Feb. 20, 1976, Ser. No. 659,724
Int. Cl.[2] H02K *3/46*
U.S. Cl. 310—260 8 Claims



1. An electrical machine stator comprising: a housing; a core; a winding mounted on said core and having upper bars and lower bars, associated pairs of upper and lower bars forming heads at the end portion of the winding; a supporting member arranged in said housing and constructed as a ring having a cylindrical projection, the height of said cylindrical projection substantially corresponding to the length of said end portion of the winding up to said heads; brackets connected to said heads and having supporting planes arranged at an angle to the internal surface of said cylindrical projection; wedges arranged between the surface of said cylindrical projection and the supporting planes of said brackets; and elastic means for

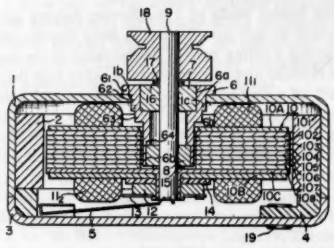
supporting said wedges between said surface of said cylindrical projection and said supporting planes of said brackets.

4,088,914

ELECTRIC MOTOR

Kanemasa Aoki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha and Canon Seiki Kabushiki Kaisha, both of Tokyo, Japan

Continuation of Ser. No. 489,085, Jul. 17, 1974, abandoned. This application Nov. 18, 1975, Ser. No. 632,969
Claims priority, application Japan, Jul. 20, 1973, 48-81468
Int. Cl.² H02K *1/22*
U.S. Cl. 310—264 **2 Claims**



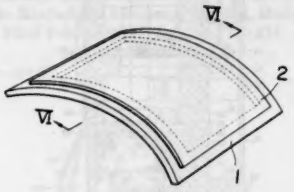
1. An electric motor, comprising:
(a) a casing;
(b) magnet means mounted around the inner periphery of said casing;
(c) an integral bearing member formed of suitable bearing material, said bearing member being secured on a first side wall of said casing to extend from said wall into said casing in the axial direction thereof;
(d) a rotor positioned for rotation within the field of said magnet means, said rotor including:
(1) a rotor shaft rotatably mounted in said bearing member;
(2) an armature core formed by laminating a plurality of laminated plate members on a core support, said core support being disposed at one end of said armature core and secured to said rotor shaft, and said plate members each having a through-hole at the center thereof, and said plate members, through sequential lamination onto said core support, being secured to said rotor shaft and forming a concave portion to receive therein a part of said bearing member from a direction along said rotor shaft;
(3) a winding wound around said armature core to pass through both end surfaces of said armature core, said windings forming concave regions on both end surfaces of said armature core owing to raised portions thereof extending beyond both end surfaces of said armature core; and
(4) a disc-shaped commutator secured on said shaft, said commutator being disposed within one concave region formed at one end surface of said core where said concave portion is not formed; and
(e) brush means resiliently contacting a part of said commutator, said brush means being fixed on a second side wall of said casing.

4,088,915

CURVED POLYMERIC PIEZOELECTRIC ELECTRO-ACOUSTIC TRANSDUCER

Akihiko Kodama, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Continuation of Ser. No. 552,140, Feb. 24, 1975, Pat. No. 4,008,408. This application Jul. 23, 1976, Ser. No. 708,283
Claims priority, application Japan, Feb. 28, 1974, 49/22866
Int. Cl.² H01L *41/04*
U.S. Cl. 310—334 **6 Claims**



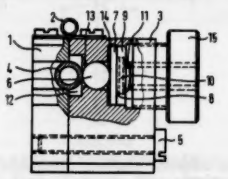
1. A piezoelectric electro-acoustic transducer, comprising:
a flexible piezoelectric diaphragm;
a rigid endless framelike support member surrounding an opening therethrough spanned by said diaphragm, said endless framelike support member being nonplanar and including a portion along its length which is curved generally in the direction of the axis of said opening, the perimetral edge of said diaphragm being attached to said endless framelike support member and following the curvature of said portion thereof, the surface of said flexible diaphragm being correspondingly curved to a nonplanar condition solely by its perimetral edge attachment to said rigid nonplanar framelike support member so as to impart at least one of tension and resiliency to said diaphragm.

4,088,916

PIEZOELECTRIC PRESSURE PICKUP

Hans Weineck, Ettlingen, and Albert Maringer, Karlsruhe, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 19, 1976, Ser. No. 715,850
Claims priority, application Germany, Aug. 28, 1975, 2538381
Int. Cl.² H01L *41/10*
U.S. Cl. 310—338 **5 Claims**



1. A piezoelectric pressure pickup for measuring pressure in a fuel injection line on an internal combustion engine comprising a two piece pipe clamp including a first member and a second member arranged to surround the fuel injection line, said first member having a groove for accepting the fuel injection line; a force transmission body in the form of a sphere for transmitting pressure pulsations of the fuel injection line; a first pressure plate; a piezoceramic plate; a second pressure plate; a leaf spring; a knurled screw; said force transmission body, said pressure plate, said piezoceramic plate, said second pressure plate, said leaf spring, and said knurled screw being arranged in that order, in abutting relationship with each other, with said leaf spring compressed, within a recess in the second part of said pipe clamp.

4,088,917

METHOD AND APPARATUS FOR THE PERMANENT POLARIZATION OF PIEZOELECTRIC BODIES

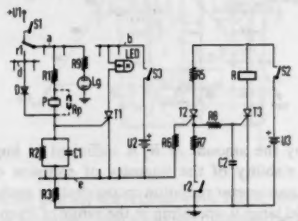
Erwin Martin; Helmut Hoffmann, and Otto Brünnert, all of Munich, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 8, 1976, Ser. No. 675,074

Claims priority, application Germany, Apr. 9, 1975, 2515478; Dec. 9, 1975, 2555378

Int. Cl.[2] H01L *41/22*

U.S. Cl. 310—357 4 Claims



1. A method for permanently polarizing a piezoelectric body, comprising the steps of:

exposing the body to a constant, polarizing electric field,

applying, during said exposing step, a surface pressure to opposite surfaces of the body, and

varying the surface pressure in an increasing direction during said applying step.

4,088,918

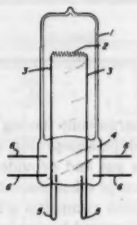
INCANDESCENT LAMP HAVING EMBEDDED SUPPORT WIRES

Paul E. Gates, Danvers, and Stephen F. Kimball, Georgetown, both of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Jul. 6, 1976, Ser. No. 702,659

Int. Cl.[2] H01K *1/14*

U.S. Cl. 313—315 3 Claims



1. In a single-ended tubular incandescent lamp containing a tungsten filament and having a press seal at one end thereof, the tungsten filament being supported on lead-in wires that are sealed in the press seal, the improvement which comprises two support wires at each side of the press seal, each support wire being embedded in the press seal and extending from the longitudinal edge thereof substantially perpendicular to the envelope axis, the support wires being unconnected to the lead-in wires, the support wires being substantially coplanar with the press seal in order to substantially eliminate torsional forces.

4,088,919

ION SOURCE INCLUDING A POINTED SOLID ELECTRODE AND RESERVOIR OF LIQUID MATERIAL

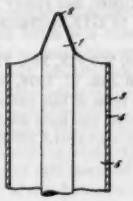
Roy Clampitt, Abingdon, and Derek Kirk Jefferies, Didcot, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Apr. 12, 1977, Ser. No. 786,872

Claims priority, application United Kingdom, Apr. 13, 1976, 15111/76

Int. Cl.[2] H01J *1/02, 1/30;* H05H *1/00*

U.S. Cl. 313—362 13 Claims



1. An ion source comprising a solid electrode made of a material such as to be perfectly wetted by a liquid material ions of which are to be emitted by the source and not corrodible by that material, and having a termination the radius of curvature of which is such that a jet of liquid material will form and be anchored to the termination of the electrode under the influence of an electric field, means for controlling the rate of transport of the liquid material over the surface of the electrode so that ions of the material are produced at the tip of the jet of liquid material under the action of the electric field, means for generating the ionizing electric field and a reservoir for the material ions of which are to be emitted by the source.

4,088,920

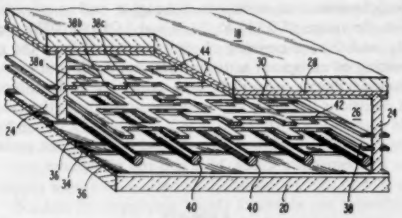
FLAT DISPLAY DEVICE WITH BEAM GUIDE

Wieslaw Wojciech Siekanowicz, Trenton; Charles Hammond Anderson, Rocky Hill, and Thomas Lloyd Credelle, East Windsor, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,358

Int. Cl.[2] H01J *29/56, 29/80, 31/20*

U.S. Cl. 313—422 33 Claims



1. A display device comprising

an evacuated envelope,

a phosphor screen within said envelope,

means in said envelope for generating and directing electrons in a substantially straight path parallel to said screen, and

guide means along said path for confining the electrons in a

beam and deflecting the beam toward said phosphor screen at selected points along said path,

said guide means including

a plurality of spaced conductors extending transversely of said beam path, on the side thereof opposite said screen,

a grid plate spaced from and parallel to said beam path, said grid plate having a plurality of spaced openings therethrough along said beam path, and

means extending along lines substantially parallel to and on opposite sides of said beam path for creating forces which laterally confine said beam to said beam path.

4,088,921

ZINC SULFIDE PHOSPHOR COACTIVATED WITH COPPER AND ALUMINUM

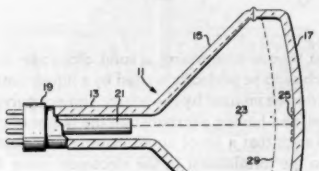
H. David Layman, Ulster, and Henry B. Minner, Dushore, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 509,928, Sep. 27, 1974, abandoned. This application Jun. 17, 1976, Ser. No. 696,876

The portion of the term of this patent subsequent to Jul. 26, 1994, has been disclaimed.

Int. Cl.[2] H01J *29/20, 31/20*

U.S. Cl. 313—467 **3 Claims**



1. A tri color cathode ray tube having at least one electron gun from which electrons are beamed to and impinged upon a cathodoluminescent screen supported by a screen supporting surface, the screen comprising: blue, green and red emitting phosphors disposed on the surface in discretely patterned groups: the green phosphor consisting essentially of zinc sulfide activated by from 10 to 200 parts per million of copper and coactivated by from 20 to 600 parts per million of aluminum and containing less than 50 parts per million of halogen, and exhibiting cathodoluminescent emissions having x and y coordinates within the range of 0.250 to 0.280 and 0.560 to 0.615 respectively; the blue phosphor consisting essentially of zinc sulfide coactivated with silver and aluminum, and exhibiting cathodoluminescent emissions having x and y coordinates within the range of 0.145 to 0.160 and 0.045 to 0.070 respectively; and the red emitting phosphor selected from the group consisting of europium activated yttrium oxide and europium activated yttrium oxysulfide, and exhibiting cathodoluminescent emissions having x and y coordinates within the range of 0.625 to 0.645 and 0.325 to 0.345 respectively, whereby the beam impingement stimulates cathodoluminescent emissions from the respective green, blue and red phosphors.

4,088,922

CERIUM MAGNESIUM ALUMINATE LUMINESCENT COMPOSITIONS, AND LAMPS UTILIZING SAME

Robert W. Wolfe, Wysox, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Aug. 30, 1976, Ser. No. 718,801

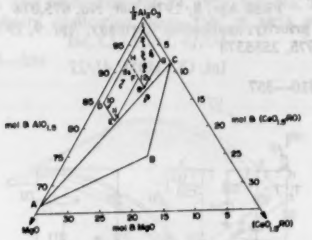
Int. Cl.[2] C09K *11/46;* **H01J** *1/63*

U.S. Cl. 313—486 **3 Claims**

1. An ultraviolet light emitting phosphor composition consisting essentially of a material represented by the formula,

$$Ce_{x-z}R_zMg_yAl_{11}O_{16.5+1.5x+y+z}$$

wherein R is selected from Ba, Ca and Sr and x and y are from about 0.14 to about 0.79 and z is a positive number to about



0.5x, whereby the amount of R_z is sufficient to improve the temperature stability of the intensity of emission of a lamp having a 254 nanometer radiation incorporating such composition when said lamp is operating in the range of from about 25° C to about 400° C.

4,088,923

FLUORESCENT LAMP WITH SUPERIMPOSED LUMINESCENT LAYERS

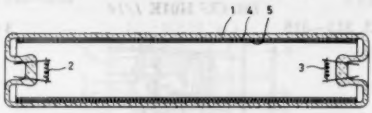
Lambertus Wilhelmus Johannes Manders, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 557,275, Mar. 11, 1975, abandoned. This application Aug. 2, 1976, Ser. No. 710,466

Claims priority, application Netherlands, Mar. 15, 1974, 7403467

Int. Cl.[2] H01J *61/48*

U.S. Cl. 313—487 **3 Claims**



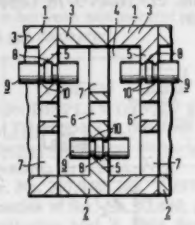
1. Electric gas discharge lamp having a vacuum tight radiation transmitting envelope comprising a quantity of mercury and a quantity of rare gas and provided with electrodes between which the discharge takes place during operation and a luminescent screen which comprises a light-transmissive support on which two superposed luminescent layers are disposed each of which layers on excitation by the radiation emanating from the discharge emit light, the layer which faces the discharge consisting of a luminescent material which per unit weight is more expensive than the material of the other luminescent layer, characterized in that the fraction p of the total amount of radiation emanating from the discharge which is converted into light by the luminescent layer facing the discharge lies between the values 0.80 and 0.99 and that the chromaticity of the light emitted by both luminescent layers together deviates less than 3.5 CIE units from the chromaticity of the light emitted by the luminescent layer facing the discharge.

4,088,924

DELAY LINE FOR TRAVELLING-WAVE TUBES

Franz Gross, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 10, 1976, Ser. No. 749,417
Claims priority, application Germany, Dec. 18, 1975, 2557154
Int. Cl.[2] H01J *25/36;* H03H *7/30*
U.S. Cl. 315—3.5 4 Claims



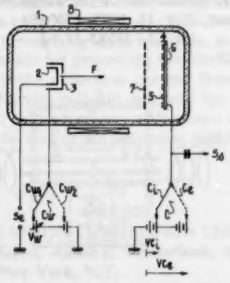
1. A delay line for travelling-wave tubes, comprising a hollow guide provided with successive transverse discs of a ductile material, each of which has at least one central opening for the passage of the electron beam, and supports an elongated attenuation member which projects into the hollow guide interior, with the longitudinal axes of the respective attenuation members extending at least approximately parallel to the longitudinal axis of the delay line and rigidly mechanically mounted in respective recesses formed in the associated transverse disc, each attenuation member being secured in the associated disc by an interlocking pressed fit, with the portion of such member encircled by the associated disc having at least one notch which extends transversely to the longitudinal axis of the member, and which notch is at least partially filled with the ductile material of the associated disc.

4,088,925

METHOD OF UTILIZING A STORAGE TUBE EMPLOYING A NON-DESTRUCTIVE READING

Jacques Deschamps, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Oct. 29, 1976, Ser. No. 736,887
Claims priority, application France, Nov. 4, 1975, 75 33699
Int. Cl.[2] H01J *29/50, 31/00*
U.S. Cl. 315—13 ST 8 Claims



1. A new method of utilizing a storage tube employing a non-destructive reading adapted to record data which are applied thereto in the form of an electrical signal, and comprising, in a vacuum enclosure, at least one electron gun capable of sending a thin beam of electrons to a storage target comprising dielectric elements on a conductive electrode, and means for deflecting said beam capable of causing it to sweep said target, comprising, for storing an electrical image corresponding to said data on the dielectric, the following steps:

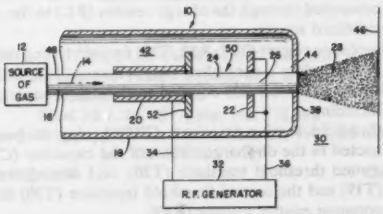
1. applying the electrical signal containing the data to be written across the cathode of said electron gun and said target so as to modulate the target-cathode potential difference;
2. controlling the means for deflecting said beam in such manner as to deflect it over the target in accordance with a predetermined sweeping mode;
3. polarizing said target at a continuous potential which is slightly positive with respect to the potential of said cathode so that said beam is a beam of slow electrons and writes said data by a deposit of negative charges $-Q_i$ on the zones swept in accordance with 2.;
4. each time that a predetermined zone of the target, which may range from a line to the whole target, has thus been written, switching the potential of the target to a continuous value which is sufficiently positive with respect to the cathode so that said beam is a beam of rapid electrons capable of removing negative charges from the dielectric that it will strike, and, simultaneously, controlling said means for deflecting the beam in such manner as to cause it to sweep over said predetermined zone on the target, the quantity $-Q$ of negative charges thus removed from the dielectric after each writing being regulated by the choice of the beam current of said beam of rapid electrons so as to put the potential of the dielectric in equilibrium within a predetermined time.

4,088,926

PLASMA CLEANING DEVICE

James C. Fletcher, administrator of the National Aeronautics and Space Administration, with respect to an invention of; Roger L. Shannon, Federal Way, and Roger B. Gillette, Auburn, both of Wash.

Filed May 10, 1976, Ser. No. 684,807
Int. Cl.[2] H01J *15/02*
U.S. Cl. 315—111.2 7 Claims



2. A plasma cleaning device for cleaning contaminated surfaces present in a high vacuum environment comprising:

a substantially hollow housing member having an outer wall, and an end wall containing an aperture, said outer and end walls separating a higher pressure region within the interior of said housing from the high vacuum environment outside of said housing;

a hollow conduit, having an admitting end section and an emitting end section disposed within said housing member;

supply means connected to the admitting end section of said conduit for supplying highly ionizable gas therethrough;

first and second electrodes, each electrode partially encircling said conduit, said first electrode intermediate of said gas supply means and said second electrode;

a non-constrictive nozzle connected to the emitting end section of said conduit and disposed adjacent to said aperture; and

a radio frequency generator connected to said first and second electrodes generating a cold plasma between said electrodes as well as between said second electrode and

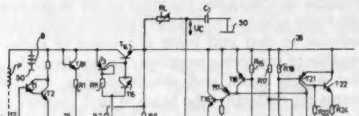
said non-constrictive nozzle, said plasma flowing into the high vacuum environment through said non-constrictive nozzle means and said aperture.

4,088,927

INTERFERENCE-PROTECTED, SWITCH-CONTROLLED SQUARE WAVE GENERATION CIRCUIT

Karl-Heinz Adler, Leonberg; Ulrich Drews, Vaihingen-Pulverdingen; Peter Werner; Heinz Möller, both of Stuttgart, and Heinz Kammerer, Nellingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 24, 1976, Ser. No. 744,789
Claims priority, application Germany, Dec. 23, 1975, 2558114
Int. Cl.[2] F02P 3/06
U.S. Cl. 315—209 T 8 Claims



1. Interference-protected, switch-controlled square wave generation circuit (13) to provide an undistorted square wave output signal under control of a switch (Z) comprising

an input stage (11) selectively having power applied thereto under control of the switch (Z);

a timing circuit (20) connected to the input stage and having a timing capacitor (C)

a charge circuit for said timing capacitor including

a voltage stabilized source (B, T3, T14, T15, 26) and a charge resistor (RL), the capacitor (C) being continuously connected through the charge resistor (RL) to the voltage stabilized source;

a discharge circuit (T12, R12, T13) for said timing capacitor (C) including a controlled switch means (T11, T12);

a threshold circuit (21) coupled to the timing capacitor (C) including

a threshold sensing transistor (T19) having its base connected to the discharge circuit of the capacitor (C) and;

a second threshold transistor (T20), said sensing transistor (T19) and the second threshold transistor (T20) having a common emitter resistor (R19),

the threshold response level of the threshold circuit (21) and the charge circuit of the timing capacitor (C) being dimensioned to cause the capacitor to charge to a level at which the threshold circuit responds only when the switch (Z) has changed state for an uninterrupted period of time of about at least 0.6 milliseconds and during which interfering or noise pulses have ceased and arising at said switch;

a feedback connection (24) between the threshold circuit (21) and the input stage and disabling transfer of a signal representative of change of state of the switch unless the threshold level of the threshold circuit has been exceeded so that the threshold circuit has responded an output transistor (T21, T22) having its base controlled by one of the threshold transistors (T20);

an interlock circuit (22) including

a blocking circuit connected to and controlled by the output transistor (T21) and having its output connected to the threshold circuit (21) to modify the threshold response level thereof,

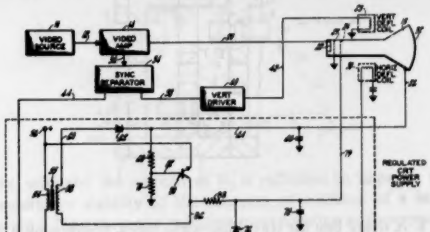
and a control transistor (T7) forming part of the input stage (11) and controlled by said feedback connection (24), said control transistor (T7) controlling one of the transistors (T11) of the controlled switch means of the discharge circuit.

4,088,928

REGULATED CRT POWER SUPPLY

Glenn Carl Waehner, Riverside, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 27, 1976, Ser. No. 754,801
Int. Cl.[2] H04N 3/18; G05F 1/46
U.S. Cl. 315—307 7 Claims



1. A regulated power supply for a CRT, said CRT including an anode and at least one screen electrode, comprising:

a first voltage means having an output for providing a high voltage DC operating potential of a first voltage level to an anode of a CRT;

a second voltage means having an output for providing an intermediate DC operating potential of a second voltage level to a screen electrode of said CRT, said second voltage level being less than said first voltage level; and

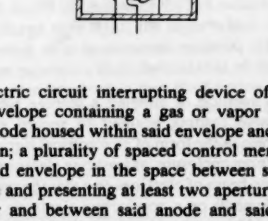
a circuit means coupled to both said voltage means and the output of said second voltage means for sensing deviations in the output voltage level of said first voltage means, and in response thereto said circuit means both providing a feedback from the output of said second voltage means to said first voltage means and increasing the output voltage level of said second voltage means.

4,088,929

ELECTRIC CIRCUIT INTERRUPTING DEVICES

Robert Joseph Wheldon, Chelmsford, England, assignor to English Electric Valve Company Limited, Chelmsford, England

Filed Jul. 13, 1976, Ser. No. 704,936
Claims priority, application United Kingdom, Jul. 26, 1975, 31372/75; Germany, Nov. 11, 1975, 2550651
Int. Cl.[2] H01J 17/14
U.S. Cl. 315—347 12 Claims



12. In an electric circuit interrupting device of the type including an envelope containing a gas or vapor filling; an anode and a cathode housed within said envelope and disposed in spaced relation; a plurality of spaced control members disposed within said envelope in the space between said anode and said cathode and presenting at least two apertures aligned with each other and between said anode and said cathode whereby an electrical discharge can pass from the cathode to

said anode; and means for producing a magnetic field to extinguish such electrical discharge, the improvement wherein said means comprises:

a first coil disposed adjacent one side of said envelope and a second coil disposed adjacent the opposite side of said envelope, the axes of said coils being aligned with each other and with the space between said control members and said coils being connected electrically in series, and means for energizing said coils to produce a magnetic field concentrated along the axes of said coils and passing within said space between said control members perpendicularly to said gas discharge.

4,088,930

COLOR TELEVISION DISPLAY DEVICE INCLUDING A CATHODE-RAY TUBE

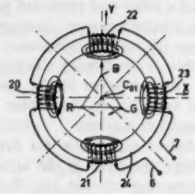
Piet Gerard Joseph Barten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 367,944, Jun. 7, 1973, abandoned, which is a continuation of Ser. No. 52,640, Jul. 6, 1970, abandoned. This application Mar. 4, 1974, Ser. No. 447,564

Claims priority, application Netherlands, Jul. 9, 1969, 6910495

Int. Cl.² H01J *29/56*

U.S. Cl. 315—370 **15 Claims**



1. A circuit for a color television display tube, said circuit comprising first and second deflection coil units adapted to receive respective deflection currents, each unit having two symmetrical coil halves which are arranged opposite to each other and defining a pair of places therebetween wherein said windings have at least a reduced winding density, the first unit being disposed 90° in the tangential direction relative to the second unit, said units being disposed around the neck of the cathode-ray tube for deflecting at least one electron beam generated in the cathode-ray tube into two orthogonal directions when the respective deflection current flows through each coil unit; means for correcting distortion including at least four windings disposed tangentially relative to one another at an angle of approximately 90° near said places respectively, switching means coupled to said windings for applying a correction current through the four windings, means coupled to said switching means for generating said correction current in accordance with the deflection current flowing through at least the first deflection coil unit, whereby the windings generate a quadripolar field which is in accordance with said deflection current at the area of the deflection plane of the electron beam.

4,088,931

PINCUSHION CORRECTION CIRCUIT

Peter Eduard Haferl, Adliswil, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Sep. 13, 1976, Ser. No. 722,600

Claims priority, application United Kingdom, Nov. 25, 1975, 48353/75

Int. Cl.² H01J *29/56*

U.S. Cl. 315—371 **42 Claims**

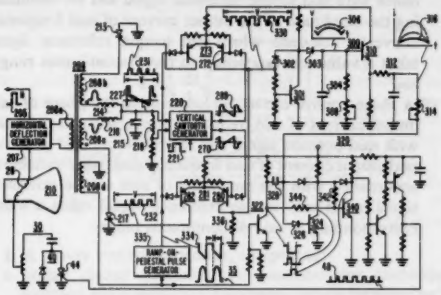
1. A pincushion correction circuit for a kinescope deflection apparatus including horizontal and vertical deflection generator systems, comprising:

a horizontal deflection winding coupled to the horizontal deflection generator system for accepting scanning current therefrom;

an impedance circuit for presenting an impedance between first and second terminals and further including a third terminal, and first coupling means for coupling said first terminal to said third terminal;

second means for serially coupling said first and second terminals of said impedance circuit with said deflection winding;

controllable switch means including a control electrode and



a controlled current path coupled between said second and third terminals;

control means coupled to the horizontal and vertical deflection generator systems and to said control electrode for operating said controllable switch means at a time during the second half of the horizontal retrace interval which time is progressively advanced during a first portion of the vertical scan interval and which is progressively retarded during a second portion of the vertical scan interval for altering said scanning current in a manner to reduce pincushion distortion.

4,088,932

CONTROL SYSTEM FOR COMMUTATORLESS MOTOR

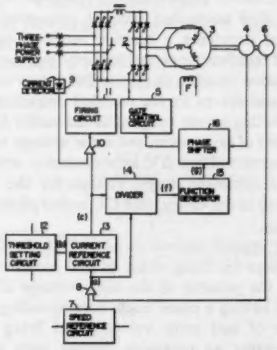
Toshiaki Okuyama, and Yuzuru Kubota, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 16, 1977, Ser. No. 778,097

Claims priority, application Japan, Mar. 17, 1976, 51-28063

Int. Cl.² H02K *29/00*

U.S. Cl. 318—138 **7 Claims**



1. A control system for a commutatorless motor, comprising:

(a) a synchronous motor having polyphase armature windings and a field winding;

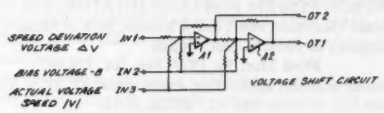
(b) a frequency converter for supplying alternating currents having variable frequencies for said armature windings;
(c) an angular position detector for detecting position signals corresponding to the angular positions of the rotor of said synchronous motor; and
(d) a speed control circuit for delivering a torque reference signal by comparing the actual speed of said synchronous motor with the reference speed; said control system is characterized by further comprising;
(e) a current control circuit for controlling the amplitude of the output current of said frequency converter in accordance with said torque reference signal and for maintaining the amplitude of the output current of said frequency converter constant when said torque reference signal takes a value corresponding to the discontinuous range; and
(f) a phase control circuit for controlling the phase of said output current of said frequency converter in accordance with said position signal and for rendering said phase of said output current of said frequency converter variable in accordance with the amplitude of said torque reference signal when said torque reference signal takes a value corresponding to said discontinuous range.

4,088,933

DC MOTOR PHASE CONTROL SYSTEM

Yoshihiro Hashimoto, Hachioji; Shigeki Kawada, Hino; Katsuo Kohari, Tachikawa, and Hiroshi Ishida, Tokyo, all of Japan, assignors to Fujitsu Fanuc Limited, Tokyo, Japan

Filed Aug. 3, 1976, Ser. No. 711,156
Claims priority, application Japan, Aug. 8, 1975, 50/96331
Int. Cl.² H02P 5/16
U.S. Cl. 318—257 **4 Claims**



1. A DC motor phase control system having an AC power supply, a first controlled rectifier connected to the power supply and providing a positive rectified output, a second controlled rectifier connected to the power supply and providing a negative rectified output, a DC motor connected to the rectifiers and driven by the rectified outputs of the rectifiers, speed detecting means coupled to the motor for detecting the actual speed of said motor, and error voltage means for generating an error voltage ΔV in accordance with the deviation between a command speed voltage for the motor and the actual speed of the motor, said DC motor phase control system comprising

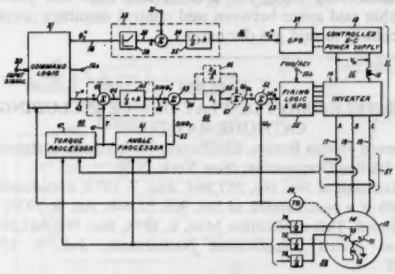
a firing control circuit connected to the first and second rectifiers for firing either of said rectifiers in accordance with the polarity of the error voltage ΔV with a firing pulse having a phase angle corresponding to the absolute value of said error voltage, said firing control circuit preventing an excessive current with reverse polarity from flowing rapidly to the armature of said motor during deceleration of said motor by shifting the phase angle of the firing pulse when the polarity of said error voltage is reversed, in accordance with the actual speed of the said motor.

4,088,934

MEANS FOR STABILIZING AN A-C ELECTRIC MOTOR DRIVE SYSTEM

John Douglas D'Atre, Erie, Pa.; Thomas Anthony Lipo, Schenectady, and Allan Barr Plunkett, Scotia, both of N.Y., assignors to General Electric Company, Erie, Pa.

Filed Oct. 4, 1976, Ser. No. 729,042
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **29 Claims**



1. An improved stabilizing scheme for an a-c electric motor comprising a stator and a rotor and provided with a source of excitation comprising electric power conversion apparatus that supplies a-c power of variable frequency to said stator, said motor being capable of developing electromagnetic force tending to move the rotor relative to the stator due to the interaction of current and flux in the motor when excited, wherein the improvement comprises:

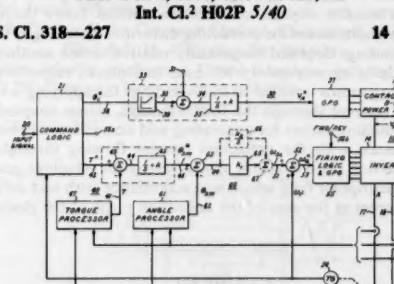
a. first means coupled to said motor for deriving an angle feedback signal representative of the actual phase angle between said interacting current and flux in the motor when excited; and
b. second means responsive to said angle feedback signal for controlling the motor excitation as a function of said angle feedback signal.

4,088,935

STABILIZING SCHEME FOR AN A-C ELECTRIC MOTOR DRIVE SYSTEM

John Douglas D'Atre, Erie, Pa., and Allan Barr Plunkett, Scotia, N.Y., assignors to General Electric Company, Erie, Pa.

Filed Oct. 4, 1976, Ser. No. 729,441
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **14 Claims**



1. An improved stabilizing scheme for an a-c electric motor comprising a stator and a rotor, said stator having effective direct and quadrature axes and said rotor being spaced from said stator by a gap, said motor being provided with a source of excitation comprising electric power conversion apparatus connected by way of electric current conductors to windings on said stator, wherein the improvement comprises:

a. means coupled to said motor and effective when the motor

is excited for deriving a first periodic signal synchronized with the fundamental component of the actual flux produced across said stator-rotor gap in a predetermined one of said stator axes;

b. means coupled to at least a first one of said conductors for deriving a second periodic signal synchronized with the fundamental stator winding current in the other stator axis;

c. phase discriminating means responsive to said first and second periodic signals for producing an angle feedback signal representative of the complement of the electrical phase displacement between said periodic signals; and

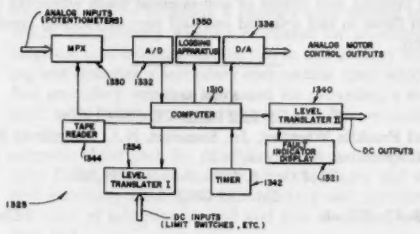
d. means responsive to said angle feedback signal for controlling the motor excitation as a function of said angle feedback signal.

4,088,936

TIRE INSPECTION SYSTEM

Donald N. Heisner, Euclid, and Charles R. Bentivegna, Mayfield Heights, both of Ohio, assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 7, 1974, Ser. No. 495,377
Int. Cl.² G05B 5/00
U.S. Cl. 318—626 **2 Claims**



1. In a tire inspection apparatus of the type including drive structure for delivering and positioning a tire at an inspection station, and inspection structure for producing a representation of selected portions of the internal structure of a tire positioned at said inspection station, wherein said drive and inspection structures each include a plurality of components movable over separate paths of travel and having separate motive structures each for moving an associated component along its respective path, the improvement of a protection apparatus, comprising:

a. sensing means connected to one of said movable components for producing a continuous analog feedback signal which signal varies substantially continuously to indicate the position of said one movable component along its travel path;

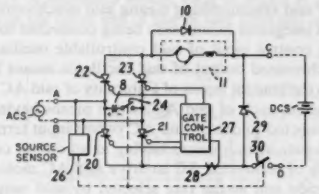
b. a control means connected between said sensing means and the associated motive structure connected to said one movable component, said control means being responsive to said feedback signal indicating that said one movable component has reached a first of two predetermined points on said travel path to produce a first output signal to said associated motive structure for slowing the movement of said movable component; said control means being responsive to said feedback signal indicating that said movable component has reached a second of two predetermined points on said travel path to produce a second output signal to said associated motive structure for preventing movement of said one movable component beyond a predetermined position along its travel path.

4,088,937

CONTROL APPARATUS

Ryohei Uchida; Mitsuru Kitano, and Yoshinobu Morimoto, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 6, 1975, Ser. No. 584,404
Claims priority, application Japan, Jun. 7, 1974, 49-65443; Jun. 17, 1974, 49-69455; Jun. 8, 1974, 49-69805; Jul. 18, 1974, 49-83040; Jul. 18, 1974, 49-83041; Aug. 9, 1974, 49-91690
Int. Cl.² H02M 7/00
U.S. Cl. 318—441 **23 Claims**



1. A power control apparatus, comprising:

a bridge circuit comprised of semiconductor controlled rectifiers each responsive to control signals for selectively rendering said controlled rectifiers conductive and non-conductive, said bridge circuit including input terminals for receiving in use an AC input power signal and input terminals for receiving in use a DC input power signal and output terminals for providing a DC output power signal in use when an input power signal is applied to said bridge circuit; and

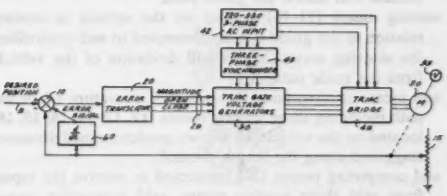
control means, responsive to an input power signal applied in use to said bridge circuit, for applying control signals to said controlled recitifiers to control their respective conductivities in a chopper mode when the applied power signal is a DC power signal in order to control a DC output power signal developed by said bridge circuit in response to the input DC power signal, and for applying control signal to said controlled rectifiers to control their respective conductivities in a converter mode when the applied power signal is an AC power signal in order to control a DC power output signal developed by said bridge circuit in response to the input AC power signal.

4,088,938

ELECTRONIC APPARATUS FOR POSITIONING AND USING AC MOTORS

Robert L. Baker, Newberg, Oreg., assignor to Vapor Corporation, Niles, Ill.

Filed Dec. 17, 1976, Ser. No. 751,642
Int. Cl.² G05B 13/00
U.S. Cl. 318—561 **12 Claims**



1. A solid-state valve actuator control system suited for use with AC motor means comprising a control input terminal, a differentiator, integrator means, a summing point, AC power input terminals, means to synchronize the start of integration of said integrator means with respect to the zero crossings of AC power input via said AC power input terminals, controllable

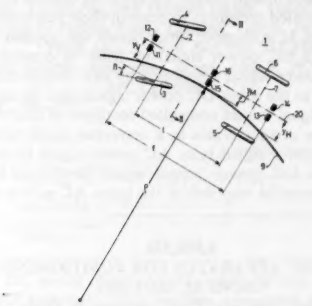
oscillator means, AC solid-state switch means, AC motor means mechanically coupled to valve means, and position feedback means mechanically coupled to said valve means; said summing point having a first input connected to said control input terminal, a second input connected to said position feedback means, a third input connected to the output of said differentiator; said differentiator having its input connected to the output of said position feedback means; said summing point output being connected to said integrator means, one of which corresponds to each phase of AC input connected to said AC power input terminals; said integrator means being initialized by zero crossings of each of said phases of AC by said synchronizing means; said synchronized outputs from said integrator means each being connected to the corresponding control input of said controllable oscillator means; said synchronized output of said oscillator means being connected to the control inputs of a plurality of said AC solid-state switch means, each of said AC switch means having a power input connected to one of said AC power input terminals; said AC solid-state switch means having as an output corresponding phases of controlled AC to drive said AC motor means in the direction and at the rate selected by said output of said summing point.

4,088,939

GUIDING AN UNTRACKED VEHICLE ALONG A PREDETERMINED GUIDE PATH

Manfred Mitschke, Wolfenbuttel, and Henning Wallentowitz, Vallstedt, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 30, 1976, Ser. No. 671,828
Claims priority, application Germany, May 15, 1975, 2521571
Int. Cl.² G05B *19/36*
U.S. Cl. 318—576 **14 Claims**



1. Guidance system for untracked vehicles along a predetermined guide path, defined by guide line means (9) comprising

a steering servo (32) on the vehicle and controlling steering deflection of the steering wheels of the vehicle so that the vehicle will follow the guide path,

sensing means (11–16) located on the vehicle in sensing relation to the guide means, connected to and controlling the steering servo (32) to null deviation of the vehicle from the guide path,

and means to determine the radius of curvature (s) of the path including three sensing means (11, 12; 13, 14; 15, 16) located on the vehicle, by known predetermined distances staggered along the length thereof,

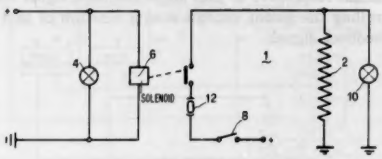
and computing means (30) connected to receive the inputs from said three sensing means, said computing means computing the radius of curvature (ρ) of the path as determined by the outputs from the three sensing means representative of the individual respective relative location of any one of the sensing means (11, 12; 13, 14; 15, 16) from the guide line means (9), and providing a steering deflection control signal to the steering servo (32).

4,088,940

DEVICE FOR CUTTING OUT LOADS IN A GENERATOR AND BATTERY FED PLANT

Giorgio Ciarniello, Vasto, and Oscar De Lena, Termoli, both of Italy, assignors to Societa Italiana Vetro SIV S.p.A., Vasto, Italy

Filed May 14, 1975, Ser. No. 577,563
Claims priority, application Italy, May 15, 1974, 51009 A/74; Feb. 12, 1975, 48126 A/75
Int. Cl.² H02J *7/14*
U.S. Cl. 322—8 **2 Claims**



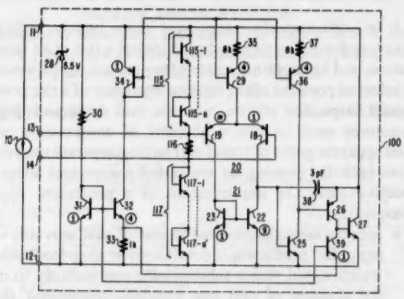
1. In a generator and battery fed electric plant which includes, in addition to a circuit of essential loads, also a circuit of non-essential loads, and a device having a warning lamp in circuit for signaling when output of generator is insufficient, the improvement comprising a voltage responsive unit including solenoid of a relay fixedly connected in parallel with said warning lamp and having a pair of normally closed contacts for opening said circuit of non-essential loads whenever current flows in said solenoid and said normally closed contacts open.

4,088,941

VOLTAGE REFERENCE CIRCUITS

Carl Franklin Wheatley, Jr., Somerset, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 5, 1976, Ser. No. 729,766
Int. Cl.² G05F *1/60*
U.S. Cl. 323—8 **7 Claims**



1. A voltage reference circuit comprising:

first and second terminals between which reference voltage is to appear in response to applied current;

a resistive element;

at least one semiconductor diode means operated at at absolute temperature T and connected in a serial combination with said resistive element;

means applying a substantially fixed portion of any potential appearing between said first and said second terminals across said serial combination to forward-bias each said semiconductor diode means and thereby cause it to exhibit an offset potential with a negative-temperature coefficient;

means responsive to the potential drop across said resistive

element due to said applied current being in excess of a threshold potential, which threshold potential is linearly proportionally related to said absolute temperature T, to provide an error signal directly related to said excess; and

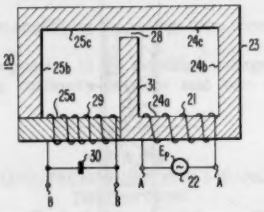
means responsive to said error signal for shunt regulating the portion of said applied current flowing through said serial combination.

4,088,942

FERRORESONANT TRANSFORMER STRUCTURE

Sandor Miko, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 719,010
Int. Cl.² G05F *3/06*; H01F *21/08*
U.S. Cl. 323—60 **5 Claims**



1. A ferroresonant transformer, comprising:

a primary winding and at least one secondary winding;

a transformer core including a primary core section upon which said primary winding is located for providing a magnetic path linking magnetic flux to said primary winding and including a secondary core section upon which a first secondary winding is located for providing a magnetic path linking magnetic flux to said first secondary winding;

a magnetic shunt path for returning portions of said magnetic fluxes generated by each of said primary and said first secondary windings without linking said portions to the other of said primary and said first secondary windings; and

a capacitor coupled to a winding other than said primary winding, the value of said capacitor selected for forming a ferroresonant transformer for generating an increased magnetic flux for saturating said secondary core section under said first secondary winding, at least a portion of said primary core section formed from a first magnetic material selected for a magnetic property wherein the saturation flux density is equal to that of low carbon non-oriented steel, said secondary core formed at least in part from a second magnetic material selected for a magentic property wherein the saturation flux density is equal to that of grain oriented silicon steel, said portion of said secondary core section further selected for a magnetic property wherein the magnetizing force at which saturation flux density occurs for said portion of said secondary core section is less than the magnetizing force at which saturation flux density occurs for said portion of said primary core section for reducing the magnetizing current requirement of said capacitor.

4,088,943

BRUSHLESS DC TACHOMETER CIRCUIT

Robert H. Schmidt, Minnetonka, Minn., assignor to Electro-Craft Corporation, Hopkins, Minn.

Filed Feb. 25, 1977, Ser. No. 772,028
Int. Cl.² H02P *9/00*
U.S. Cl. 322—90 **6 Claims**

1. A brushless tachometer providing a DC output voltage proportional to the rotational speed of a shaft, comprising:

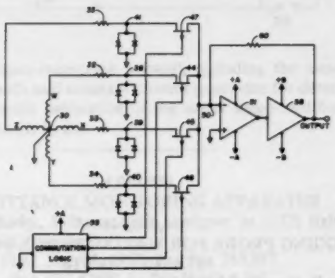
amplifier means having an input summing junction and an output terminal;

means for generating a magnetic field rotatable with said shaft;

a plurality of coils positioned about said shaft for engagement by said magnetic field as said shaft is rotated, one end of each of said coils being connected to a source of reference potential;

a plurality of switching devices each of which has a first switching terminal connected to said summing junction of said amplifier and each of which has a second switching terminal and a control terminal;

a plurality of resistance means, each of which is connected between the other end of one of said coils and one of said



second switching terminals of one of said switching devices;

a plurality of pairs of unidirectional current conducting and voltage offset devices connected between said second switching terminal of each of said switching devices and said source of reference potential; and

commutation means for sensing the angular position of said shaft and providing control signals to each of said control terminals of each of said plurality of switching devices for rendering said switching devices conductive for a portion of one revolution of said shaft during which time the voltage across said coil is proportional to the rotational speed of said shaft such that the signal at the output terminal of said DC amplifier means is proportional to the rotational speed of said shaft.

4,088,944

NMR SPECTROMETER EMPLOYING SELF CENTERING TURBINE

Clifford G. Engler, Redwood City, and Joseph J. Sipirora, Campbell, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Oct. 4, 1976, Ser. No. 729,048
Int. Cl.² G01R *33/08*
U.S. Cl. 324—.5 AH **9 Claims**

1. In a gyromagnetic resonance spectrometer apparatus, probe means for holding a sample tube in a undirectional field, means for exciting and detecting gyromagnetic resonance of samples in said unidirectional field,

a sample spinner apparatus for rotating the sample within

said unidirectional field, said sample spinner having a turbine which floats on and is turned by fluid under pressure, THE IMPROVEMENT COMPRISING said turbine being an elongated cylindrically shaped member having an axial bore at least partially therethrough to receive said sample tube.

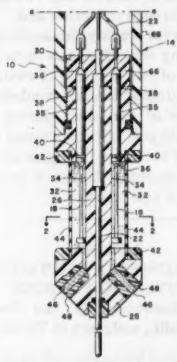
means for attaching said sample tube to said turbine at a plurality of discrete locations, such that said sample tube axis is aligned with the axis of said turbine, said plurality of discrete locations including locations displaced in a longitudinal direction determined by the direction of the axis of said turbine.

4,088,945

LOGGING PROBE FOR MAKING REDOX POTENTIAL MEASUREMENTS

Eddie P. Howell; Orland J. Gant, Jr., both of Plano; Daniel P. Hearn, Richardson, and Robert D. Coffee, Dallas, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 23, 1976, Ser. No. 753,759
Int. Cl.[2] G01V *3/18*
U.S. Cl. 324—10 **7 Claims**



5. In a probe for electrical logging of subsurface formations by measuring electrical potential arising in a fluid-filled borehole including a reference electrode and a measuring electrode electrically isolated from each other and disposed within the body of said probe so as to contact the fluid in said borehole, the improvement comprising:

(a) a reference electrode member;

(b) a fluid electrolyte within which at least a portion of said electrode member is immersed to form said reference electrode;

(c) means within said probe body for containing said electrolyte;

(d) flexible means forming an interface between said containing means and the borehole fluid and adpated thereby to transmit the external hydrostatic pressure of said borehole fluid to said electrolyte; and

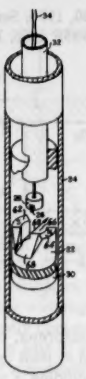
(e) permeable means adapted to establish a fluid bridge between said electrolyte and said borehole fluid.

4,088,946

MAGNETIC BRIDGE TRANSDUCER FORMED WITH PERMANENT MAGNETS AND A HALL EFFECT SENSOR FOR IDENTIFYING THE PRESENCE AND LOCATION OF FERROMAGNETIC DISCONTINUITIES WITHIN OR ON A TUBULAR SPECIMEN

Robert G. Charles, Allison Park, and William T. Lindsay, Jr., Irwin, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 28, 1975, Ser. No. 599,499
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—220 **12 Claims**



1. Apparatus for identifying the presence and location of ferromagnetic discontinuities within or on a tubular specimen comprising:

a first source of a static magnetic field sized to slidably fit within the tubular specimen and constructed to generate a radially directed magnetic field having a substantially uniform strength 360° around a given axis parallel to the axis of revolution of the specimen and positioned to permit movement along the given axis with the magnetic flux generated in communication with the specimen wall;

a Hall element in magnetic communication with and fixedly positioned with respect to the first source and arranged to be in magnetic communication with the specimen as part of a magnetic loop where the magnetic flux communication path through the specimen extends in series between the first source, the specimen and the Hall element, the Hall element having an output representative of the strength of a magnetic field having a component contribution from lines of force proximate and perpendicular to a given plane of the Hall element; and

means for altering the magnetic field of the first source in magnetic communication with the Hall element to substantially null the output of the Hall element in the absence of ferromagnetic discontinuities within or on the specimen along the series flux path, said means for altering the magnetic field being fixedly positioned with respect to the Hall element.

4,088,947

ELECTRICAL CONTINUITY TEST APPARATUS HAVING A FORWARD BIASED DIODE ACROSS THE TEST TERMINALS

Felta Carl Farmer, Jr., Marion, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 3, 1976, Ser. No. 692,497
Int. Cl.[2] G01R *31/02*
U.S. Cl. 324—51 **8 Claims**

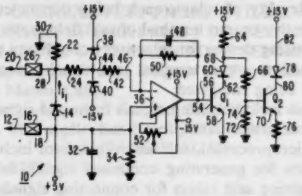
8. An apparatus for detecting electrical continuity between two measurement points comprising:

a. a pair of measurement terminals, each capable of being

electrically connected to a different one of said measurement points;

b. a diode coupled between said measurement terminals;

c. means including a resistor and d.c. source connected in series across said terminals for providing a forward bias voltage drop across said diode of approximately 0.6 volt;



d. means for amplifying the voltage drop across said diode; and

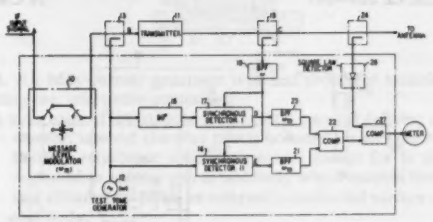
e. means responsive to the amplified voltage for visually indicating continuity between said two measurement points.

4,088,948

SINGLE TONE TECHNIQUE FOR MEASURING IM DISTORTION

Hotze Miedema, Boxford, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 23, 1976, Ser. No. 753,706
Int. Cl.² G01R *27/00*
U.S. Cl. 324—57 R **7 Claims**



1. A method of measuring the non-linearity of an active device subject to distortion, which comprises the steps of:

generating a test-tone of constant amplitude and fixed frequency, said fixed frequency falling within the passband of the active device;

adding said test-tone to an amplitude-modulated, multi-frequency signal which lies within the passband of said active device thereby forming a composite signal;

applying said composite signal to the input of said active device; and then

detecting, at the output of said active device, non-linear components of said test-tone signal, the amplitude of said non-linear components being directly proportional to the non-linearity of the device under test.

4,088,949

BATTERYLESS OHMMETER

Milton Goldish, and Arthur Edward Evenson, both of 4500 W. Cortland, Chicago, Ill. 60639

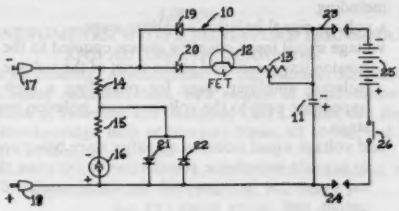
Filed Mar. 4, 1977, Ser. No. 774,321
Int. Cl.² G01R *27/02*
U.S. Cl. 324—62 **6 Claims**

1. A batteryless ohmmeter including a meter provided with a plurality of calibrated scales comprising

a. a battery test circuit including a chargeable energy storage device,

b. a constant current generator in circuit with said energy storage device and through which current is discharged into the meter,

c. a pair of test leads provided by said battery test circuit and adapted to be momentarily connected to an external voltage source for charging said energy storage device, and



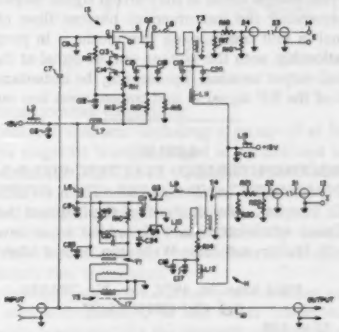
d. a resistance-measuring network including the meter in circuit with said constant current generator for determining the scale calibration of the meter when said battery test circuit is in use.

4,088,950

IMMITTANCE MONITORING APPARATUS

Thomas J. Kirby, Pelham, N.H., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jan. 31, 1977, Ser. No. 763,857
Int. Cl.² G01R *21/06;* H04B *1/04*
U.S. Cl. 324—95 **5 Claims**



1. Voltage, current, and phase monitoring apparatus comprising:

transmission line means for conducting an RF signal therealong;

current signal amplifier means for producing a current output signal representing the instantaneous current flow of the RF signal in said transmission line means at a current signal output terminal, said current signal amplifier means including

a current signal isolation amplifier stage,

current signal input coupling means coupled to the transmission line means and to the input of the current signal isolation amplifier stage for providing a low input impedance path to the current signal isolation amplifier stage,

said current signal isolation amplifier stage being operable to provide impedance transformation between the signal present at its input and the signal produced at its output, and

current signal delay means coupling the signal at the output of the current signal isolation amplifier stage to the current signal output terminal for causing a first predetermined time delay between the signal at the output of the current signal isolation amplifier stage and

the current output signal at the current signal output terminal; and

voltage signal amplifier means for producing a voltage output signal representing the instantaneous voltage of the RF signal in said transmission line means at a voltage signal output terminal, said voltage signal amplifier means including

a voltage signal isolation amplifier stage,

voltage signal input coupling means coupled to the transmission line means and to the input of the voltage signal isolation amplifier stage for providing a high input impedance path to the voltage signal isolation amplifier stage,

said voltage signal isolation amplifier stage being operable to provide impedance transformation between the signal present at its input and the signal produced at its output, and

voltage signal delay means coupling the signal at the output of the voltage signal isolation amplifier stage to the voltage signal output terminal for causing a second predetermined time delay between the signal at the output of the voltage signal isolation amplifier stage and the voltage output signal at the voltage signal output terminal;

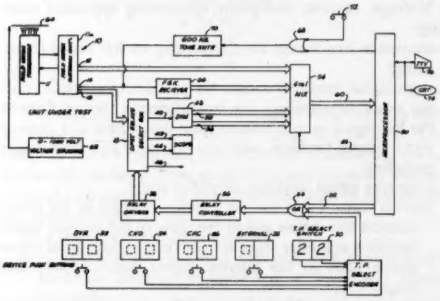
said first predetermined time delay of the current signal delay means plus propagation delays in the current signal input coupling means and in the current signal isolation amplifier stage being equal to said second predetermined time delay of the voltage signal delay means plus propagation delays in the voltage signal input coupling means and in the voltage signal isolation amplifier stage whereby the current output signal at the current signal output terminal representing the instantaneous current flow of the RF signal in said transmission line means is in proper phase relationship with the voltage output signal at the voltage signal output terminal representing the instantaneous voltage of the RF signal in said transmission line means.

4,088,951

MICROCOMPUTERIZED ELECTRIC FIELD METER DIAGNOSTIC AND CALIBRATION SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Larry D. Holley, and Jerry W. Mason, both of Merritt Island, Fla.

Filed Mar. 24, 1977, Ser. No. 780,874
Int. Cl.[2] G01R *35/02*
U.S. Cl. 324—130 **5 Claims**



1. An apparatus for testing the calibration of a field meter having output terminals upon which signals are produced in the form of digital signals, analog voltages, and frequency-shift-keyed signals, said apparatus comprising:

(a) means for applying a reference signal to said field meter causing signals to be produced on said output terminals of said meter,

(b) a multiplexer;

(c) a frequency-shift-keyed receiver means connected between said multiplexer and said output terminal upon which said frequency-shift-keyed signals appear for converting said frequency-shift-keyed signals to digital signals and supplying said digital signals to said multiplexer;

(d) a plurality of signal processing devices;

(e) a plurality of relays, each being connected between a respective output terminal of said field meter and a signal processing device for selectively coupling a signal from a respective output terminal to a signal processing device upon being energized;

(f) means for connecting signals from said signal processing devices to said multiplexer; and

(h) a microprocessor, said microprocessor including:

(i) means for generating command signals for selectively energizing said relays for connecting signals on selected terminals to said multiplexer, and

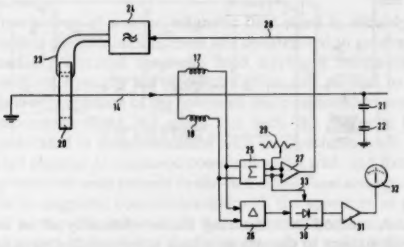
(ii) means for supplying command signals to said multiplexer causing signals received thereby to be transferred to said microprocessor for being compared with stored information.

4,088,952

PROCESS AND APPARATUS FOR DETERMINING THE POSITION OF AN ELONGATED OBJECT WITH RESPECT TO A REFERENCE AXIS

Harald Sikora, Bremen, Germany, assignor to Maschinenbau Scholz GmbH & Co. KG, Westfalen, Germany

Filed May 13, 1976, Ser. No. 685,974
Claims priority, application Germany, May 13, 1975, 2521278
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—207 **14 Claims**



1. A process for determining the absolute position of an elongated object with respect to a reference axis, the object having an electrically conductive portion covered with insulating material and lying generally along the reference axis, said method comprising the steps of:

establishing a localized alternating magnetic field at a first location along the reference axis;

establishing a path for axial flow of electrical current in the conductive portion of said object;

placing the object in the localized alternating magnetic field for inducing a current in the object which generates a coaxial magnetic field about the object;

sensing the magnitude of the generated magnetic field at a second location displaced along the reference axis from said first location;

comparing the sensed magnitude of the generated magnetic field with a desired magnitude of the generated magnetic field;

altering the strength of the localized alternating magnetic field in accordance with any deviation between the sensed and desired magnitude of the generated magnetic field to restore the generated magnetic field to the desired magnitude;

measuring the intensity of the generated magnetic field at at

least a pair of stations positioned on different sides of the reference axis at said second location and;

comparing the measurements obtained at said pair of stations to provide an indication of the absolute position of the object with respect to the reference axis.

4,088,953

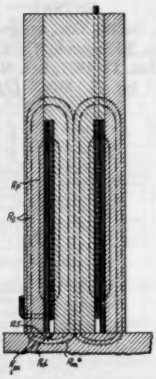
EDDY-CURRENT TEST PROBE UTILIZING A COMBINATION OF HIGH AND LOW RELUCTANCE MATERIALS TO OPTIMIZE PROBE SENSITIVITY

Suren Sarian, Seattle, Wash., assignor to The Reluxtrol Company, San Mateo, Calif.

Continuation-in-part of Ser. No. 538,955, Jan. 6, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 741,666

Int. Cl.² G01R *33/12*

U.S. Cl. 324—232 13 Claims



1. An eddy-current generator type test probe for material testing use, said probe comprising:

a main body of low reluctance magnetic material defining an annular, internal chamber that is bounded on all sides by the low reluctance magnetic material except for in the region of an annular gap in said body which extends from said chamber to break an externally connected surface of said body,

an axially wound exciting coil of electrically conductive wire within said annular chamber, said coil being the only coil within said annular chamber and including terminal means for use in connecting said coil to alternating current means for operating said coil at a suitable frequency for the particular material testing to be done,

a sleeve of high reluctance material within said chamber, concentric with said coil and extending lengthwise of the body adjacent said coil for the full length of said coil, and high reluctance material extending through said gap in the low reluctance material from said concentric coil and sleeve of high reluctance material, terminating substantially even with surface portions of said body which immediately bound both sides of said surface break, and forming therewith an annular test gap region which in use is positioned contiguous a material to be tested,

said low reluctance material including a core portion, said concentric coil and sleeve of high reluctance material immediately surrounding said core portion, and said low reluctance material including a surrounding portion which immediately surrounds said concentric coil and sleeve of high reluctance material, and

said high reluctance material being selected to have a reluctance that is much higher than the reluctance of the material to be tested and being a material which at the operating frequency of the coil during material testing use has an electromagnetic skin depth which is substantially less than the thickness of said high reluctance material, so that said high reluctance material influences substantially all of the magnetic flux which is generated by the coil to flow outwardly of said body, across said gap and through the material being tested, resulting in the total reluctance of the magnetic circuit being concentrated within the material being tested.

4,088,954

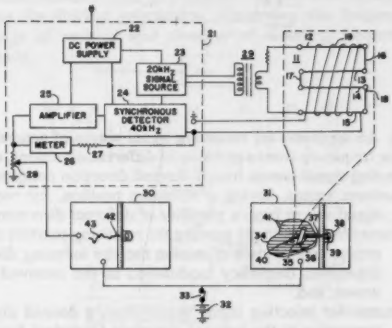
MAGNETOMETER WITH A MINIATURE TRANSDUCER AND AUTOMATIC SCANNING

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of William J. Debnam, Jr., Hampton; Carl L. Fales, Jr.; Roger A. Breckenridge, both of Newport News, all of Va., and Arthur V. Pohm, Ames, Iowa

Continuation of Ser. No. 547,072, Feb. 4, 1975, abandoned. This application Mar. 19, 1976, Ser. No. 668,771

Int. Cl.² G01R *33/04*

U.S. Cl. 324—249 2 Claims



1. A magnetometer comprising:

A miniature transducer including a group of at least two plated magnetic wires arranged in parallel and all in the same plane physically and connected in series electrically to serve as a drive circuit, several turns of wire wound around said group of plated magnetic wires to serve as a sense coil and a binding material coating the combined said drive circuit and said sense coil for forming a flat and extremely thin transducer;

means for supplying an a.c. current with sufficient amplitude and with a frequency *f* to said series connected plated magnetic wires to drive the magnetic coating of the magnetic wires into saturation in the circumferential direction twice each cycle;

a first *x-y* recorder with means, substituted for the ink pen of the *x-y* recorder, for holding said miniature transducer such that the transducer will scan the specimen as the recorder is operated in the *x* direction and means for applying a voltage to said *x-y* recorder to cause it to operate in the *x* direction;

said miniature transducer mounted on said first *x-y* recorder such that the plane containing said plated magnetic wires is close to and parallel to the surface of said specimen as said miniature transducer is moved over the surface of said specimen; and

means connected to said sense coil for measuring the signal induced in the sense coil due to the magnetic field being measured including a second *x-y* recorder with the voltage means applied to the *x* input of said first *x-y* recorder also applied to the *x* input of the second *x-y* recorder and means connected to the sense coil for applying a signal proportional to the signal induced in the sense coil to the *y* input of said second *x-y* recorder whereby when a voltage is applied to the *x* inputs of said first and second *x-y* recorders the miniature transducer is moved in the *x* direction over the first *x-y* recorder and the ink pen of the

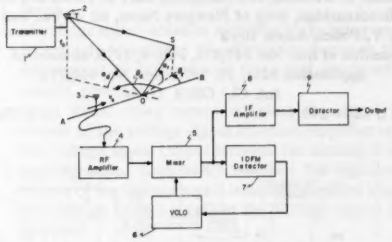
second *x-y* recorder is moved in the *x* direction over the second *x-y* recorder and records in the *y* direction the signals induced in the sense coil.

4,088,955

INTERFERENCE REJECTION TECHNIQUE

Elie J. Baghdady, 21 Overlook Dr., Weston, Mass. 02193

Filed Apr. 7, 1975, Ser. No. 565,591
Int. Cl.² H04B *7/02*
U.S. Cl. 325—56 **14 Claims**



1. An apparatus for receiving signal waves of generally the same frequency from a plurality of different directions, and for selecting signal waves from a desired direction comprising:

antenna means, having a receiving position, for receiving signal waves from a plurality of different directions;

means for repetitively moving the receiving position along a predetermined path of motion thereby inducing direction dependant frequency modulation in the received signal waves; and,

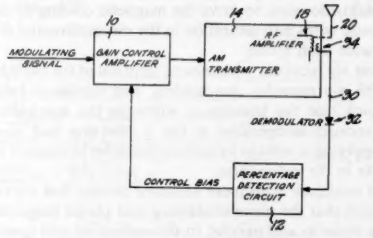
means for selecting signal waves from a desired direction responsive to the induced direction dependant frequency modulation of the received signal waves.

4,088,956

AUTOMATIC MODULATION PERCENTAGE CONTROL FOR AMPLITUDE MODULATED TRANSMITTERS

Michael P. Axman, 714 Christian Ave., Elkhart, Ind. 46514

Filed Feb. 27, 1976, Ser. No. 662,280
Int. Cl.² H04B *1/04*
U.S. Cl. 325—159 **7 Claims**



1. In an automatic modulation percentage control for an amplitude modulated radio frequency transmitter having input terminals for the application of a modulating signal voltage,

means for sampling the output of the transmitter,

a modulation percentage detection circuit for comparing the alternating current AC and direct current DC components of the output sample, said alternating current and direct current components being proportional to modulation and average carrier level respectively, said detection circuit generating a gain control bias voltage at a selected modulation percentage threshold,

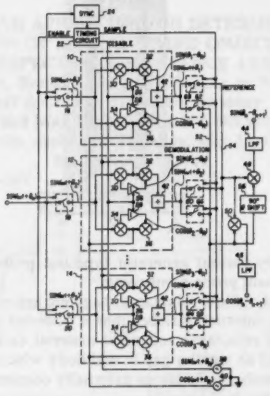
a gain control amplifier responsive to said control bias, the output of said gain control amplifier being connected to the input of the transmitter and controlling the magnitude of the modulating voltage at said input terminals.

4,088,957

METHOD AND APPARATUS FOR SYNCHRONOUSLY DETECTING A DIFFERENTIALLY ENCODED CARRIER SIGNAL

William C. Perkins, Sachse, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 17, 1977, Ser. No. 759,946
Int. Cl.² H04B *1/16*
U.S. Cl. 325—320 **10 Claims**



1. A demodulator for synchronously detecting and demodulating information differentially encoded in the consecutive bit intervals of a carrier signal, the information being conveyed by some characteristic of the carrier signal, comprising:

at least three receiver circuits, each for receiving at its input the carrier signal when enabled, producing in response thereto an output signal indicative of the carrier signal characteristic at the time of enablement and storing it until disabled;

first switching circuit means for periodically enabling each of said receiver circuits to receive the carrier signal during an individual bit interval in a predetermined sequence;

second switching circuit means for periodically disabling said receiver circuits in said predetermined sequence, each disablement occurring in a bit interval separated from the associated interval in which the disabled receiver circuit was previously enabled by at least one bit interval;

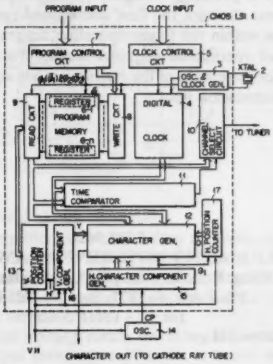
comparison means for comparing and providing an indication of the carrier signal characteristic difference between two signals applied thereto, and

third switching circuit means for periodically applying the outputs of a pair of said receiver circuits to said comparison means during each bit interval in said predetermined sequence, said pair being constituted by one of said receiver circuits after the termination of its enablement and the immediately preceding receiver circuit in said predetermined sequence prior to its disablement.

4,088,958
INTEGRATED CIRCUIT FOR A PROGRAMMABLE TELEVISION RECEIVER

Yasoji Suzuki, Ayase; Tomohisa Shigematsu, Yokohama; Nawoyuki Kokado, Tokyo, and Yukinori Kudo, Fujisawa, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sep. 13, 1976, Ser. No. 722,761
Claims priority, application Japan, Sep. 17, 1975, 50-111680
Int. Cl.[2] H04B *1/16*
U.S. Cl. 325—396 **5 Claims**



1. An integrated circuit for use in a programmable television receiver comprising:

an oscillator to which a quartz crystal is to be externally coupled;

a digital clock coupled to said oscillator;

a memory for storing a plurality of programs each including time data and associated channel data and having a plurality of recirculating dynamic shift registers each adapted to store one program;

a character generating circuit coupled to said memory and adapted to generate character signals to permit the content of said memory to be displayed on the screen of a cathode ray tube of a television receiver;

circuit means coupled to the output of said oscillator to generate shift pulses for driving said recirculating dynamic shift registers in said memory;

time comparision means coupled to the outputs of said memory and said digital clock for comparing the time data in said memory and the time of said digital clock;

means to readout said channel data from said memory; and

means responsive to said time comparing means and said readout means to form a program execution output based on said channel data when a coincidence occurs between the time data in said memory and the time of said digital clock.

4,088,959
MULTIPLE-BAND DIGITAL FREQUENCY SYNTHESIZER RECEIVER

Yasuaki Sumi, Tottori, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi and Tottori Sanyo Electric Co., Ltd., Tottori, both of, Japan

Filed May 4, 1976, Ser. No. 682,832
Claims priority, application Japan, May 30, 1975, 50-65938
Int. Cl.[2] H04B *1/32*
U.S. Cl. 325—459 **13 Claims**

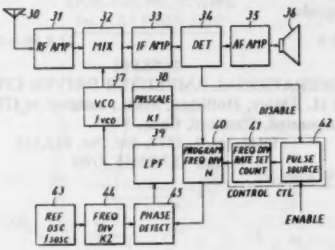
1. A superheterodyne receiver, comprising means for receiving a high frequency signal in each of a plurality of receiving frequency bands, local oscillating means for providing an oscillation frequency signal the frequency of which is different by a given frequency difference from said received high frequency signal, and mixing means responsive to said received high frequency signal and said local oscillation frequency signal for providing an intermediate frequency signal; said local oscillating means comprising voltage controlled oscillating means for providing said local oscillation frequency signal the oscillation frequency of which is variable as a function of a given control voltage,

means for modifying the oscillation frequency of the output from said voltage controlled oscillating means by dividing the frequency of the output from said voltage controlled oscillating means,

first means for varying the amount of frequency modification of said oscillation frequency modifying means by varying the division ratio of said modifying means,

means responsive to the output from said oscillation frequency modifying means as controlled by said first means for providing said control voltage for said voltage controlled oscillating means, whereby said local oscillating means is adapted to provide a local oscillation frequency signal the frequency of which is associated with the frequency division ratio as controlled by said first means,

means for storing information concerning the frequency range of each of said plurality of receiving frequency bands,



means for selecting one of a plurality of receiving frequency bands,

means responsive to the operation of said frequency band selecting means setting the information from said storing means concerning the frequency range of a selected band into said first means for defining one boundary of the variation of the division ratio of said oscillating frequency modifying means thereby enabling reception of the frequencies in the corresponding selected receiving band,

means for providing a signal representative of a predetermined tuning state of the frequency of the signal received by said high frequency signal receiving means of said receiver,

means for commanding a tuning operation by said receiver,

said first means including means responsive to the output from said tuning operation commanding means to vary the frequency division ratio of said oscillation frequency modifying means in a given direction and responsive to said signal representative of the predetermined tuning state of said receiver means to discontinue the variation of said frequency division ratio produced by said first means.

4,088,960
MONOLITHICALLY INTEGRABLE CORRELATION DETECTOR

Paul Wray Osborne, Neptune, N.J., assignor to Osborne-Hoffman, Inc., Point Pleasant Beach, N.J.

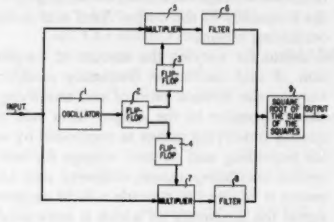
Filed Jan. 18, 1977, Ser. No. 760,344
Int. Cl.[2] G06G *7/20*
U.S. Cl. 328—144 **7 Claims**

1. In a correlation detector for detecting tones, a circuit for finding the square root of the sum of the squares of quadrature signals generated in multipliers of the correlation detector comprising:

(a) a two phase to multiphase converter means converting

two input signals in quadrature into varying amplitude multiphase signals; and

(b) a magnitude comparator means connected to said converter means driven by said multiphase signals and responsive to said multiphase signals generated in the two phase



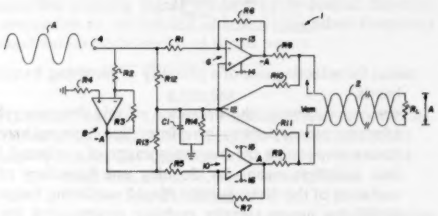
to multiphase converter, and means for detecting the largest amplitude of said multiphase signals whereby the said largest amplitude signal substantially represents the square root of the sum of the squares of said quadrature signals.

4,088,961

OPERATIONAL AMPLIFIER DRIVER CIRCUIT

Albert H. Ashley, Holliston, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jul. 1, 1977, Ser. No. 812,112
Int. Cl.[2] H03F 3/60
U.S. Cl. 330—53 **6 Claims**



1. An operational amplifier driver circuit for supplying a signal A to a load connected across a pair of twisted transmission lines, said transmission lines having common mode signals thereon due to the presence of noise of an external, uncontrolled nature, said driver circuit comprising:

first and second operational amplifier means each having a predetermined linear operating range and each having an inverting input, a non-inverting input, and an output;

input means for coupling a signal A to the inverting input of the first operational amplifier means and a signal −A to the inverting input of the second operational amplifier means;

first and second resistances connected to the outputs of the first and second operational amplifier means, respectively, and to corresponding ones of the pair of transmission lines;

third and fourth resistances connected in series with the first and second resistances, respectively, and with a common juncture, said juncture being connected to the non-inverting inputs of both the first and second operational amplifier means;

a resistance network connected to the juncture of the third and fourth resistances;

said third and fourth resistances and said resistance network being operative to reduce by a predetermined percentage common mode signals present on the transmission lines and to apply the reduced common mode signals to the non-inverting inputs of the first and second operational amplifiers means;

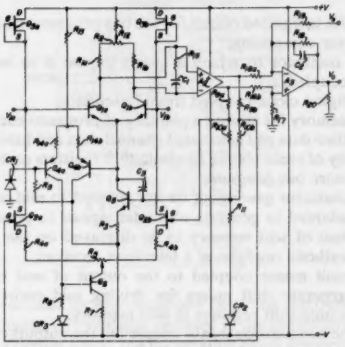
said first and second operational amplifier means and said first, second, third and fourth resistances being operative in response to signals A and −A coupled to the inverting inputs of the first and second operational amplifier means to supply a signal A across the load connected across the pair of transmission lines, and said first and second operational amplifier means being operative in response to reduced common mode signals at their non-inverting inputs to produce voltages at their outputs and establish currents through the first and second resistances having values within the linear operating ranges of the first and second operational amplifier means, thereby to compensate for the effects of the common mode signals on the pair of transmission lines.

4,088,962

SELF BIASING DIFFERENTIAL AMPLIFIER

Ted R. Trilling, Berkshire Rd., R.D. 4, Doylestown, Pa. 18901

Filed Apr. 6, 1977, Ser. No. 785,005
Int. Cl.[2] H03F 3/45
U.S. Cl. 330—261 **11 Claims**



11. A differential amplifier system comprising in combination:

input amplifier means adapted to receive an input signal having common mode and differential mode components and connected to receive a first common mode feedback signal, for producing a first output signal;

output amplifier means connected to receive the first output signal, for supplying a second output signal, which is an amplified replica of the first output signal, to a load, and third and fourth signals which are the differential mode and common mode components, respectively, of the second output signal;

first active feedback means connected to receive the third and fourth output signals for providing common mode and differential mode feedback signals to the input of said input amplifier means for controlling the impedance thereof; and

second active feedback means connected to receive the first common mode feedback signal and a reference voltage level for providing a second common mode feedback signal to said first active feedback means;

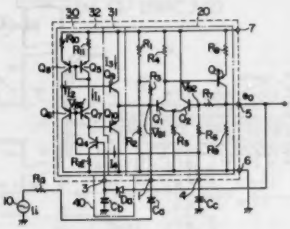
whereby the common mode component of said input signal is cancelled and the input signal is self-biased to a predetermined voltage level.

4,088,963

GAIN CONTROL CIRCUIT

Fujio Machida, Nakaminato, and Kazuya Takahashi, Mito, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Jun. 10, 1976, Ser. No. 694,725
Claims priority, application Japan, Jun. 13, 1975, 50-70813
Int. Cl.[2] H03G *3/30*
U.S. Cl. 330—284 **18 Claims**



1. A gain control circuit comprising

(a) a sound amplifier circuit including an audio signal input terminal and an audio signal output terminal, said sound amplifier circuit amplifying and introducing to said sound output terminal the audio signal applied to said audio signal input terminal;

(b) gain control voltage means including an input terminal and an output terminal, said input terminal being connected to said audio signal output terminal, said means detecting part of the audio signal when said audio signal appears at said audio signal output terminal, said means producing a gain control voltage on the basis of said detected signal;

(c) an attenuator circuit connected between the output terminal of the gain control voltage-generating means and said audio signal input terminal of said sound amplifier circuit,

said attenuator circuit comprising a current control circuit controlled by the gain control voltage so as to be in a conducting state when said audio signal is applied to said audio signal input terminal and a gain control voltage above a predetermined voltage level is produced at the output terminal of said gain control voltage-generating means, and controlled so as to be in a nonconducting state when no audio signal exists on said audio signal input terminal, and further comprising a signal attenuator circuit controlled in accordance with the conducting state of said current control circuit, said signal attenuator circuit comprising a first transistor of a first conductivity type and a second transistor of a second conductivity type connected to each other in such a manner that the collector and emitter currents thereof flow in the same conducting direction; and

said current control circuit comprising a third transistor controlled so as to be in a conducting state when the gain control voltage is above a predetermined voltage level and a current control semiconductor circuit controlled so as to be in a conducting state in accordance with the conducting state of said third transistor, and the current thereof being controlled by said third transistor, where said current control semiconductor circuit is provided with first and second current control semiconductor elements respectively having at least one junction electrode of a first type semiconductor and a second type semiconductor, the first type electrode of said first current control semiconductor element being connected to the base electrode of said first transistor, the second type electrode of said second current control semiconductor element being connected to the base electrode of said second transistor, and the remaining first and second type electrodes of said first and second current control semiconductor elements being connected commonly so that said first and second current control semiconductor elements control the current of said first and second transistors;

(d) circuit means for connecting the commonly connected electrodes of said first and second current control semiconductor elements in said current control circuit to a point of the same DC potentials as that of said audio signal input terminal of said sound amplifier circuit and for connecting the commonly connected electrodes to ground with a low impedance with respect to AC frquencies;

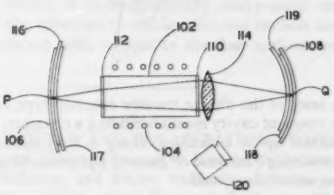
(e) means for connecting the common emitter of said first and second transistors in said signal attenuator circuit directly to said audio signal input terminal of said sound amplifier circuit.

4,088,964

MULTI-MODE THRESHOLD LASER

Richard G. Clow, 624 Black Canyon Stage, Phoenix, Ariz. 85020

Continuation-in-part of Ser. No. 543,173, Jan. 22, 1975, abandoned, which is a continuation of Ser. No. 398,332, Sep. 18, 1973, abandoned, which is a continuation of Ser. No. 117,784, Feb. 22, 1971, abandoned, which is a continuation of Ser. No. 720,262, Apr. 10, 1968, abandoned. This application Apr. 15, 1976, Ser. No. 677,391
Int. Cl.[2] H01S *3/10*
U.S. Cl. 331—94.5 C **6 Claims**



1. A method for simultaneously controlling the oscillation of a large number of modes of a multi-mode laser with spatially separated modes such that for each such mode there exists a region of spatial separation, where the intensity of said mode is relatively high and the intensity of all other modes is very low, including the steps of:

(a) placing a saturable absorber, bleachable by the radiation emitted by the multi-mode laser, in the region of spatial separation of each mode to be controlled;

(b) directing optical control beams, capable of bleaching the saturable absorber, onto the saturable absorber contained in the region of spatial separation of each mode which is to be caused to oscillate, one distinct optical control beam for each such mode;

(c) pumping the multi-mode laser to the extent that a mode not containing saturable absorber in its region of spatial separation is able to oscillate but modes containing saturable absorber in their regions of spatial separation are not able to oscillate;

wherein the improvement comprises the additional steps of:

(d) selecting the frequency of the optical control beams to be within the gain profile of the active element of the multi-mode laser;

(e) reshaping the wave front shape of the optical control beams to be the same as the wave front shape of the beams emitted by the modes that said optical control beams are to control, each optical control beam wave front shape being matched to the wave front shape of the beam emitted by the specific mode which it is to control; and

(f) simultaneously redirecting the reshaped optical control beams toward the multi-mode laser so that their direction of propagation is the reverse of the beams emitted by the respective modes which they are to control, and so that the reshaped optical control beams simultaneously enter

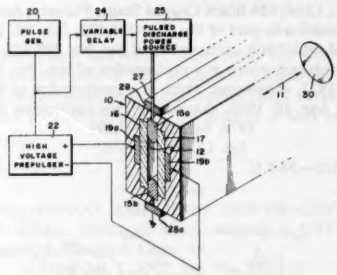
the modes which they are to control and are substantially amplified by the active element of the multi-mode laser before being absorbed by the saturable absorber thus increasing the sensitivity of the control operation to the optical control beams.

4,088,965

CHARGE TRANSFER REACTION LASER WITH PREIONIZATION MEANS

James B. Lauderslager, Sierra Madre, and Thomas J. Pacala, Los Angeles, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 12, 1976, Ser. No. 704,180
Int. Cl.[2] H01S *3/00*
U.S. Cl. 331—94.5 G **21 Claims**



1. A laser of the charge transfer reaction type comprising:

laser resonant cavity means including a chamber, defining an internal space extending along a longitudinal axis and containing a mixture of gases at a pressure of not less than one atmosphere; and

circuit means including;

first means for preionizing the gas mixture in said space, said first means including means for inducing charge carriers in said gas mixture;

second means including first electrode means for discharging a pulse of energy into the gas mixture after the first means induced charge carriers therein to thereby initiate a charge transfer reaction between different gases of said mixture; and

third means for controlling said first electrode means to discharge energy into said gas mixture after the first means induced the charge carriers.

4,088,966

NON-EQUILIBRIUM PLASMA GLOW JET

Michael A. Samis, 726 Orchard St., Apt. 7, Santa Rosa, Calif. 95404

Division of Ser. No. 479,102, Jun. 13, 1974, Pat. No. 3,946,332. This application Feb. 2, 1976, Ser. No. 654,212
The portion of the term of this patent subsequent to Mar. 23, 1993, has been disclaimed.
Int. Cl.[2] H01J *17/26*
U.S. Cl. 313—231.5 **10 Claims**

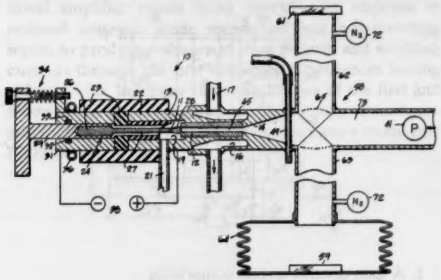
1. A non-equilibrium plasma generator for exciting high vibrational and electronic temperatures and low translational temperatures in a gaseous medium comprising in combination,

a. an anode member having a cylindrical passageway,

b. a cathode member electrically insulated from said anode member positioned in axial alignment with said cylindrical passageway of said anode proximate an entrance thereof to define an annular throat region, the anode providing the outer surface of said annular throat region, the solid cathode providing the inner surface of said annular throat region,

c. means for establishing stable supersonic vortex flow of said gaseous medium through said annular throat region, said stable supersonic vortex flow of said gaseous medium swirling coaxially about the axis of said annular throat region,

d. means establishing an electrical potential between said cathode member and said anode member for creating an electrical discharge across said annular throat region, said stable supersonic vortex flow of said gaseous medium through the throat region converting said electrical discharge into a stable glow discharge region having axial symmetry across said flowing gaseous medium immediately downstream from said throat region, said gaseous medium flowing supersonically through said glow discharge region, whereby plasma and excited gaseous species having high vibrational and electronic temperatures and low translational temperatures flowing at supersonic velociites are produced.

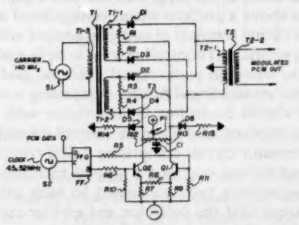


4,088,967

SPLIT-RING DIGITAL PHASE MODULATOR

Stephen George Harman, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Apr. 20, 1977, Ser. No. 789,242
Int. Cl.[2] H03C *3/38*
U.S. Cl. 332—23 R **6 Claims**



1. A split-ring modulator comprising:

two pairs of diodes, each pair connected in like series;

first and second intermediate ports connected in a ring configuration with the free ends of the diodes;

a first input/output port, transformer coupled to both the intermediate ports;

a second input/output port connected between the junctions of the two pairs of diodes;

a third input/output port, coupled between center points of the two intermediate ports and the center point of the second input/output port;

means for coupling a carrier signal and a data switching signal to, and a modulated output signal from, different ones of the three input/output ports; and

means for applying a reverse bias to said diodes of such magnitude to minimize the magnitude of the fold-over sidebands which fall in the in-band response of the modulated output signal.

4,088,968

FREQUENCY LINEARIZATION AND SENSITIVITY EQUALIZATION OF A FREQUENCY MODULATED CRYSTAL OSCILLATOR

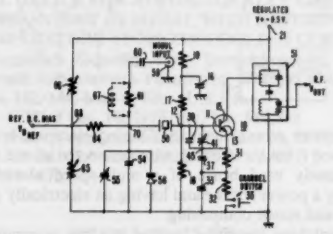
Bortolo Mario Pradal, and Paul Lawrence Buess, both of Pittsburgh, Pa., assignors to RCA Corporation, New York, N.Y.

Filed Jun. 3, 1977, Ser. No. 803,225

Claims priority, application United Kingdom, Nov. 8, 1976, 46461/76

Int. Cl.[2] H03C 3/22

U.S. Cl. 332—26 7 Claims



1. In a frequency modulated crystal control oscillator including a current conducting device for providing amplification to sustain oscillations and a frequency determining circuit connected to said current conducting device for controlling the frequency of oscillation, said frequency determining circuit including a crystal element resonant at a frequency dependent upon a reactance connected in series therewith, the improvement for improving the linearity of the modulation of the oscillator, comprising:

a voltage variable capacitance connected in series with said crystal element;

a second capacitance coupled across the series combination of said crystal element and said voltage variable capacitance; a third capacitance connected across said voltage variable capacitance; said crystal element, said voltage variable capacitance, said second capacitance and said third capacitance forming a parallel resonant circuit at the fundamental frequency of said oscillator;

means for applying an initial D.C. reference bias across said voltage variable capacitance to set the center frequency of oscillation;

means for applying a modulating voltage across said voltage variable capacitance to change the capacitive reactance thereof to thereby change the frequency of operation of said crystal element and modulate the frequency of oscillations; and

said second and third capacitances having selected capacitance values to provide a frequency deviation vs. voltage that is generally symmetrical about the initial D.C. reference bias.

4,088,969

TAPPED SURFACE ACOUSTIC WAVE DELAY LINE

James D. Crowley; Joseph F. Weller, both of Oxon Hill, Md., and Thomas G. Giallorenzi, Springfield, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 19, 1977, Ser. No. 788,874

Int. Cl.[2] H03H 9/30; H03F 3/04; H01L 45/02; H03F 3/55

U.S. Cl. 333—30 R 12 Claims

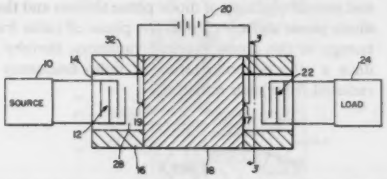
1. A delay line comprising:

a piezoelectric acoustically elastic substrate having a substantially planar surface with a first velocity of elastic wave propagation;

a first electroacoustic transducer mounted on said surface for transforming electromagnetic energy into a surface acoustic wave and propagating said surface acoustic wave in a given direction along said surface;

a second electroacoustic transducer mounted on said surface and spaced from said first transducer in said given direction, for receiving acoustic waves and transforming them into electromagnetic energy;

a piezoelectric element having substantially planar and parallel, first and second opposed surfaces, the first surface being placed near the surface of said substrate but separated therefrom by an air gap which is less than the wavelength of said surface acoustic wave, said element being located between said transducers and having a second-velocity of bulk acoustic wave propagation which is less



than said first velocity of surface acoustic wave propagation, any surface acoustic wave generated by said first transducer along the surface of said substrate exciting a bulk wave in said element by means of piezoelectric leaky-wave coupling, said bulk wave propagating within said element and being reflected from the second to the first surface where it piezoelectrically leaky-wave couples back to the substrate to excite a second surface acoustic wave delayed with respect to the first surface acoustic wave.

4,088,970

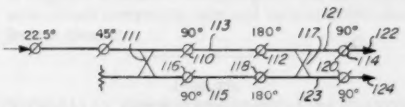
PHASE SHIFTER AND POLARIZATION SWITCH

Matthew Fassett, Billerica; Russell W. Hansen, Stoughton; John F. Toth, Billerica, and Pietro Ventresca, Littleton, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Feb. 26, 1976, Ser. No. 661,676

Int. Cl.[2] H03H 7/20; H01P 1/18, 5/16, 9/00

U.S. Cl. 333—31 R 3 Claims



1. In a directional antenna for radio frequency energy, such antenna including an array of pairs of cross-polarized radiators, each one of such radiators being selectively actuable to determine both the direction in which a beam of radio frequency energy is propagated and the polarization of the radio frequency energy in such a beam, a broad band feed arrangement for each pair of cross-polarized radiators comprising:

(a) a section of stripline having a first and a second hybrid coupler formed therein, the first one of such couplers being disposed to be actuated by radio frequency energy to be radiated and the second one of such couplers being disposed to be actuated by radio frequency energy out of the orthogonal ports of the first such coupler;

(b) a first plurality of diode phase shifters, each one thereof being arranged, when actuated, to shift the phase of radio frequency energy passing therethrough by a multiple of 90°, serially connected between a first orthogonal port of the first hybrid coupler and a first input port of the second hybrid coupler;

(c) a second plurality of diode phase shifters, each one thereof being arranged, when actuated, to shift the phase of radio frequency energy passing therethrough by a multiple of 90°, serially connected between a second or-

thogonal port of the first hybrid coupler and a second input port of the second hybrid coupler;

(d) a pair of diode phase shifters, each one thereof being arranged, when actuated, to shift the phase of radio frequency energy passing therethrough by 90°, disposed in the path of radio frequency energy out of the orthogonal arms of the second hybrid coupler;

(e) means for connecting radio frequency energy out of each one of the pair of diode phase shifters to a different one of the cross-polarized radiators; and

(f) means for selectively actuating selected ones of the first and second plurality of diode phase shifters and the pair of diode phase shifters to shift the phase of radio frequency energy to the cross-polarized radiators, thereby to produce a selected polarization of radio frequency energy radiated from such radiators.

4,088,971

FLAT HIGH FREQUENCY CABLE USEABLE WITH VEHICLE TRANSMITTER-RECEIVER

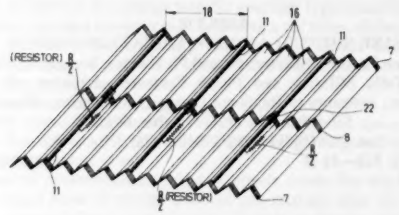
Walter Hermann, Weissenfeld; Burkhart Kiehl, Ottobrunn, and Wolf Dieter Schuck, Putzbrunn, all of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Germany

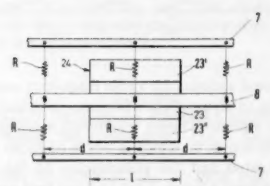
Filed Jul. 23, 1976, Ser. No. 708,217

Claims priority, application Germany, Aug. 8, 1975, 2535381; Oct. 11, 1975, 2545669; Oct. 21, 1975, 2547011

Int. Cl.² H01P *3/00*

U.S. Cl. 333—84 R **44 Claims**





1. A flat high frequency cable comprising longitudinal conductor means having a given conductivity and including at least two longitudinal conductors, insulating means locating said conductor means in spaced relationship relative to each other along their entire length, transverse conductor means having a transverse conductivity substantially smaller than said given longitudinal conductivity, said transverse conductor means comprising a number of discrete components, and means connecting said discrete components to said longitudinal conductors along the length thereof, said longitudinal conductor means comprising two outer conductors and a central conductor, said cable further comprising short circuiting means effectively short circuiting said two outer conductors, and connector means connecting each of said discrete components between said central conductor and said short circuiting means.

4,088,972

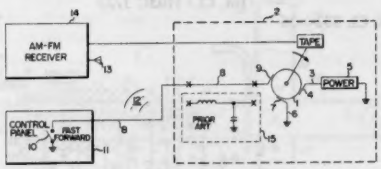
ELECTRICAL CIRCUIT ARRANGEMENT FOR FILTERING MOTOR BRUSH NOISE

James G. Staley, Batavia, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 15, 1977, Ser. No. 787,936

Int. Cl.² H02P *1/00*

U.S. Cl. 318—532 **5 Claims**



1. A circuit arrangement for filtering electrical brush noise transmitted from a switching wire connected at one end to an intermittently used brush of a multi-speed electric motor driven by a power source and having an electrically grounded housing and stator comprising:

a. a switching transistor located in close proximity to said electric motor;

b. the collector of said transistor connected to said switching wire at a point on said switching wire in close proximity to said brush;

c. said switching wire terminating at a point in close proximity to said connection with said collector;

d. the emitter of said transistor connected by reasonably direct route to electrical ground at a point in close proximity to said transistor;

e. the base of said transistor electrically connected to a biasing means; and

f. said biasing means and said transistor electrically connected to a remote switch control means.

4,088,973

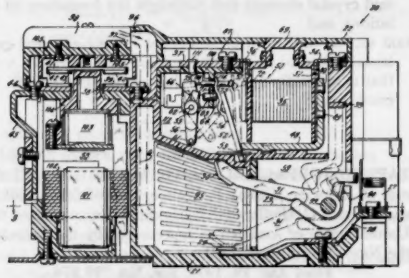
UNITIZED COMBINATION STARTER

Frank W. Kussy, Haverford, Pa.; Bernard Dimarco, Bellefontaine, Ohio; Andrew J. Kralik, Marysville, Ohio, and Keith T. Krueger, Bellefontaine, Ohio, assignors to Gould Inc., Rolling Meadows, Ill.

Filed Apr. 28, 1976, Ser. No. 681,243

Int. Cl.² H01H *73/00, 83/00*

U.S. Cl. 335—6 **12 Claims**



1. An electrical protective device including a multipole circuit breaker and a multipole electromagnetic contactor connected in electrical series with said circuit breaker, housing means including a base having said circuit breaker and said contactor mounted thereon with said contactor being at one end of said circuit breaker; said housing means including openable front cover means for said circuit breaker and said contactor; said circuit breaker comprising an overload sensing electromagnetic device including an individual operating coil for each pole of said circuit breaker; said circuit breaker also

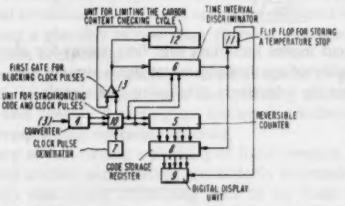
including a set of cooperating contacts for each pole thereof and a mechanism for operating said sets of cooperating contacts between open and closed positions; said mechanism including an operating handle having a forwardly extending manually engageable portion; each of said coils being accessible for removal and replacement from the front of said housing means upon opening of said cover means; said cover means when in operative position covering the front of said housing means blocking removal of said coils.

4,088,974

DIGITAL DEVICE FOR AUTOMATICALLY CHECKING CARBON CONTENT IN METAL WITH REFERENCE TO TEMPERATURE STOPS ON COOLING CURVE

Leonid Sergeevich Zhitetsky, ulitsa Vernadskogo, 61, kv. 8/4, and Leonid Solomonovich Fainzilberg, prospekt 40-letia Oktyabrya, 142/144, both of Kiev, U.S.S.R.

Filed Sep. 18, 1975, Ser. No. 614,532
Claims priority, application U.S.S.R., Jan. 21, 1975, 210027
Int. Cl.[2] G06F *15/20*; G01N *25/02*
U.S. Cl. 364—472 63 Claims


UNIT FOR LIMITING THE CARBON CONTENT CHECKING CYCLE
TIME INTERVAL DISCRIMINATOR
FLIP FLOP FOR STORING A TEMPERATURE STOP
FIRST GATE FOR BLOCKING CLOCK PULSES
UNIT FOR SYNCHRONIZING CODE AND CLOCK PULSES
CONVERTER
REVERSIBLE COUNTER
CLOCK PULSE GENERATOR
CODE STORAGE REGISTER
DIGITAL DISPLAY UNIT

1. A digital device, for automatically checking the carbon content in a metal with reference to temperature stops in a cooling curve, comprising:

a converter, which converts the actual temperature of the metal into a numerical pulse code, having an input whereto there is applied a signal carrying information on the temperature of the metal, a first output of code pulses corresponding to a positive increment of temperature on the cooling curve, and a second output of code pulses corresponding to a negative increment of temperature on the cooling curve;

a reversible counter, for converting the numerical pulse code into a parallel code, having an add input, a subtract input, and digit outputs,

said reversible counter being electrically connected through its add input and subtract input to the first and second code pulse outputs of said converter;

a time interval discriminator having a first input of code pulses corresponding to a positive increment of temperature on the cooling curve, a second input of code pulses corresponding to a negative increment of temperature on the cooling curve, a clock pulse input, and an output,

said time interval discriminator being electrically connected through its first and second inputs to the first and second outputs of said converter;

a clock pulse generator having a clock pulse output and being electrically connected through its output to the clock pulse input of said time interval discriminator;

a code storage register, for storing codes corresponding to temperature stops on the cooling curve, having a information inputs, a control input, and digit outputs,

said code storage register being electrically connected through its information inputs to digit outputs of said reversible counter, and being electrically connected through its control input to the output of said time interval discriminator; and

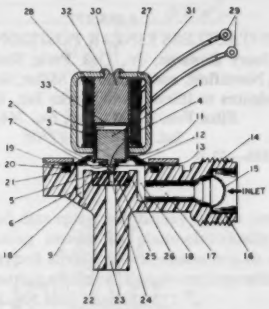
a digital display unit having information inputs and being electrically connected through its information inputs to the digit outputs of said register.

4,088,975

ALTERNATING CURRENT SOLENOIDS

Gregor L. Lang, 295 East St., Suffield, Conn. 06078

Division of Ser. No. 215,052, Jan. 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 830,342, Jun. 4, 1969, Pat. No. 3,647,177. This application Apr. 21, 1975, Ser. No. 570,215
Int. Cl.[2] H01H *85/30*
U.S. Cl. 335—244 16 Claims



1. In an electromagnetic solenoid having in combination a coil with a ferrous core and a ferrous plunger armature extending axially therein, said armature being adapted for the operative attachment thereto of a chosen external load, and a ferrous structure exterior of said coil forming with said core and said armature a substantially closed loop magnetic circuit linking said coil;

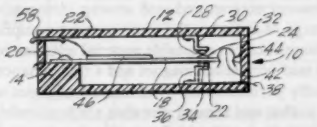
the improvement thereof comprising, said exterior structure comprising a unitary member forming a closed quadrate loop defining a plurality of divisional flux paths therethrough disposed about said coil in substantial symmetry and characterized by substantial coequality in length, thickness, and magnetic cross-section, thereof, said exterior member being in direct joined assembly with one end of said core with the divided flux in said member flowing in magnetic confluence through said core, said loop magnetic circuit comprising only said three specified discrete ferrous elements.

4,088,976

THERMALLY OPERATED BIMETAL ACTUATOR

Lon E. Bell, Altadena, Calif., assignor to Technar, Inc., Arcadia, Calif.

Filed Oct. 14, 1975, Ser. No. 622,024
Int. Cl.[2] H01H *61/02, 71/16*
U.S. Cl. 337—107 12 Claims



1. An ambient temperature compensated thermal actuator device for operating switches or the like comprising an elongated thin bimetal element in which the same metal is on the same side of the element throughout its length, first support means anchoring one end of the element along a portion of the length to provide a cantilevered support, second support means attached to the first support means engaging the bimetal element adjacent the other end and constraining the element lengthwise under compression between the two support means, whereby the bimetal element buckles into a curved shape, and heater means for applying heat selectively to only

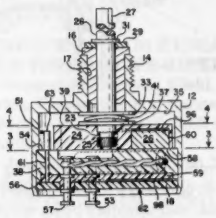
limited areas of the bimetal element between the supports, the heater means including a substrate of very thin flexible nonconductive material applied to a small portion of one surface of the bimetal element between the support means, and serpentine-shaped conductive pattern forming an electrical resistance heater on the surface of the nonconductive material.

4,088,977

CONTACTLESS LINEAR POSITION SENSOR

Joseph Henry Bowman, Jr., Oak Park; Rand Jeffery Eikelberger, Northfield, and Arnold M. Miller, Schiller Park, all of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 2, 1977, Ser. No. 764,771
Int. Cl.[2] H01L *43/08*
U.S. Cl. 338—32 R **10 Claims**



1. In a rotary contactless device comprising first and second elongated sensing elements, each of which has a substantially straight longitudinal axis and is shaped to form a rectangular projection in a plane, said sensing elements being positioned so that said elongated axes intersect to form a first angle which is less than 180°, at least one permanent magnet positioned adjacent said sensing elements, rotation means coupled to said permanent magnet to provide for the rotation thereof and limit means constructed to limit the range of rotation of said permanent magnet by said rotation means relative to said sensing elements, said permanent magnet being shaped to have first and second substantially straight sides each of which pass adjacent one of said rectangular projections so as to intersect the associated longitudinal axis of said sensing elements, said sides lying along said lines that intersect to form a second angle that faces said first angle and is less than 180° and is further limited so that neither of said sides can pass beyond the outer edges of the respective projection adjacent said side over the limited range of rotation of said permanent magnet that is allowed by said limit means, and so that the total area of said projections that are positioned adjacent said permanent magnet is substantially constant regardless of the relative position of said permanent magnet and said sensing elements within said limited range of rotation, the improvement comprising a pole piece of magnetically permeable material adjacent to and rotatable with said permanent magnet and a flux enhancer means of magnetically permeable material located adjacent said sensing elements so that said sensing elements are positioned intermediate said pole piece and said flux enhancing means.

4,088,978

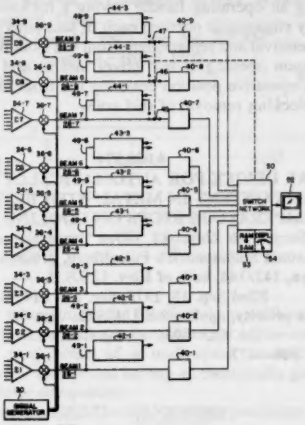
SYNTHETIC APERTURE SIDE-LOOKING SONAR SYSTEM

George A. Gilmour, Severna Park, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 27, 1976, Ser. No. 727,195
Int. Cl.[2] G01S *9/66*
U.S. Cl. 340—3 R **13 Claims**

1. Side-looking sonar apparatus, comprising:

a. first means for obtaining a plurality of real aperture beam signals;



b. second means including said first means for obtaining a plurality of synthetic aperture beam signals; and

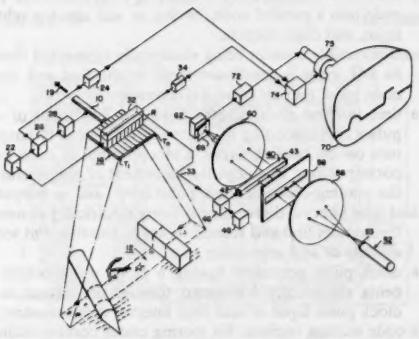
c. means for selectively displaying said signals.

4,088,979

UNDERWATER IMAGING SYSTEM

Charles H. Jones, Pasadena, Md., and Milton Gottlieb, Churchill Boro., Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 14, 1976, Ser. No. 723,256
Int. Cl.[2] G01S *9/66, 7/62*
U.S. Cl. 340—5 H **22 Claims**



1. An electro-opto-acoustic imaging system comprising:

acoustic means including a plurality of transducers each operable to provide an output signal indicative of acoustic energy from a target area to be viewed;

an opto-acoustic delay line system;

means for converting said signals into a phase hologram which propagates along said opto-acoustic delay line; and

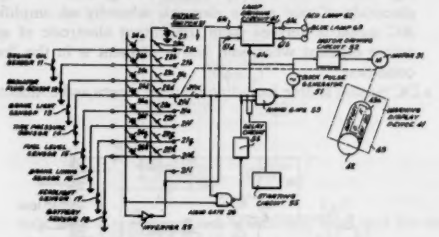
means for converting said phase hologram into a visual display of said target area.

4,088,980

WARNING DISPLAY SYSTEM FOR VEHICLES

Kou Tanigawa, Kobe, and Takeshi Ochiai, Toyota, both of Japan, assignors to Fujitsu Ten Limited, Kobe and Toyota Jidosha Kogyo Kabushiki Kaisha, both of, Japan

Filed Dec. 30, 1976, Ser. No. 755,864
Claims priority, application Japan, Dec. 30, 1975, 51-158910
Int. Cl.[2] G08B 19/00
U.S. Cl. 340—52 F 2 Claims



1. A warning display system for vehicles for warning of an abnormal condition occurring at operating elements of a vehicle having a plurality of operating element, and warning display system comprising

a plurality of sensors each provided in operative proximity with a corresponding one of the operating elements, each of said sensors detecting an abnormal condition of the corresponding operating element;

a rotary switch having a plurality of fixed contacts, an additional contact and a sliding arm slidably mounted to selectively electrically contacting each of the fixed contacts, each of the fixed contacts except the additional contact being electrically connected to a corresponding one of the sensors;

a warning display device having a rotatably mounted drum with a plurality of display items indicated on its circumference, each of the operating elements of the vehicle being represented by a corresponding one of the display items, and a display window adjacent the drum for visual observation of one of the display items at a time;

a first lamp in the drum for illuminating the lamp and the display item adjacent the display window when the lamp is energized;

a step motor having an output shaft coupled to the sliding arm of the rotary switch and to the drum for driving said sliding arm and said drum in synchronism;

an energization circuit for driving the step motor step by step, said energization circuit including an oscillator for generating a pulse and a motor driving circuit electrically connected between the oscillator and said step motor for converting the pulse generated by said oscillator to a driving voltage for energizing said step motor;

a control circuit electrically connected to the energization circuit for discontinuing the operation of said step motor and energizing said lamp when the sliding arm of the rotary switch reaches the position of the fixed contact of said rotary switch connected to a sensor which detects an abnormal condition, said control circuit warning of the abnormal condition by visually displaying the corresponding display item of the drum at the display window in the illuminated condition of said lamp when said step motor is stopped; and

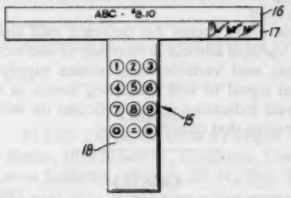
position control means having a signal inverting circuit electrically connected between each of the sensors and the additional fixed contact of the rotary switch corresponding to a display item to display a normal condition of all operating elements, said position control means providing an output signal for positioning the sliding arm of the rotary switch on the additional contact until an abnormal condition is detected by a senor.

4,088,981

AUTOMATED DATA ENTRY AND DISPLAY SYSTEM

Stephen P. Gott, Westport, Conn., assignor to Citibank N.A., New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,479
Int. Cl.[2] G06K 7/10
U.S. Cl. 340—146.3 SY 6 Claims



1. An automated data entry and display system comprising:

a. a wand having means for photo-electrically reading printed and typed alpha-numeric characters on a surface and for outputting electrical signals corresponding to the photo-electrically read characters;

b. optical character recognition means electrically connected to the wand for receiving and recognizing electrical signals from the wand corresponding to any printed and typed alpha-numeric characters and for generating and transmitting electrical signals corresponding to the received recognized electrical signals;

c. alpha-numeric keyboard electrical input means for transmitting electrical signals corresponding to designated alpha-numeric characters; and

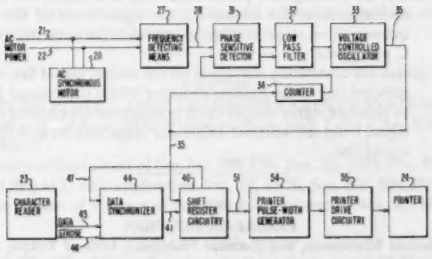
d. display means electrically connected to the alpha-numeric keyboard electrical input means and to the optical character recognition means for receiving electrical signals transmitted from said keyboard means and said optical character recognition means and for displaying for viewing designated symbols in response thereto.

4,088,982

DOCUMENT PROCESSING, CHARACTER READING APPARATUS

Frank J. Haas, Harper Woods, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 28, 1977, Ser. No. 773,007
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 ED 17 Claims



1. A document processing apparatus that reads characters from a document and indicates the characters that cannot be read on said document as the document passes through said apparatus comprising:

(a) a character reader that reads characters from said document and provides a first electrical signal in response to the inability to read one of the characters from said document;

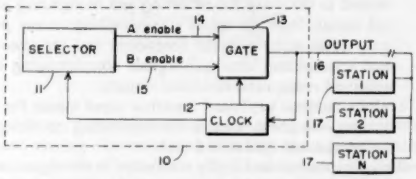
(b) an indicating means located a fixed distance from said character reader for indicating on the document the character that cannot be read adjacent such character;
(c) motion means including an AC synchronous motor for moving said document in a continuous motion relative to and adjacent said reader and indicating means;
(d) motor velocity detecting means for detecting the velocity of said motor, said motor velocity detecting means providing a second electrical signal representative of said velocity; and
(e) variable delay means for delaying said first electrical signal a variable amount in response to said second electrical signal, said variable delay means supplying a third electrical signal to said indicating means in response to which said indicating means indicates on said document the character that cannot be read.

4,088,983

ELECTRONIC POLLING AND CALLING COMMUNICATION SYSTEM

Kenneth C. Crandall, Roseville, Minn., assignor to Elan Industries, Inc., St. Paul, Minn.

Filed Oct. 28, 1975, Ser. No. 626,233
Int. Cl.[2] H04Q 9/00
U.S. Cl. 340—147 R **7 Claims**



1. For electronic communication between a central station which transmits a communication signal train consisting of a series of N + 1 sequential uniform-amplitude square wave pulses, each of said N pulses representing a different remote station and being of short duration for an unselected remote station and being of intermediate duration for a selected remote station and the additional synch pulse being of long duration: means at each remote station for receiving the transmitted signal train and for producing a pulse signal on a first signal line (C pulses) for each received short duration pulse or greater and a pulse signal on a second signal line (R pulses) for each received synch pulse;
sequencer circuit means having N + 1 stages and an output signal line for each stage;
means for feeding said pulses from said first signal line into said sequencer for advancing the signal state of the sequencer from stage to stage in sequence for each received C pulse; and
means for combining the signal on the output signal line of a selected one of the sequencer stages with a third signal line to produce signal output upon concurrent appearance of a signal from the selected sequencer stage and on said third signal line.

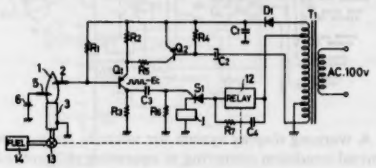
4,088,984

FLAME DETECTION

Shoichi Muramoto, and Susumu Nishigaki, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 18, 1976, Ser. No. 687,467
Claims priority, application Japan, May 28, 1975, 50-64663
Int. Cl.[2] G08B 17/06
U.S. Cl. 340—228 R **6 Claims**

1. Flame detecting apparatus comprising:
a detecting electrode disposed in a flame position;
a burner for producing a flame in said flame position, the impedance between said burner and said detecting electrode depending on whether a flame is present in said flame position;
an active element having input, output and control electrodes and having an "on" condition and an "off" condition;
an AC power source;
a transformer having an input winding connected to said AC power source, and an output winding;
said output winding of said transformer providing an AC signal source for supplying an AC signal to the input electrode of said active element, whereby an amplified AC signal is derived from the output electrode of said active element when said active element is in the "on" condition;
a DC biasing source including rectifier means and connected



to said output winding of said transformer, said biasing source being connected in series with said impedance for supplying a control signal to the control electrode of said active element, the control signal being such that said active element is in the "on" condition when a flame is present in said flame position;
wherein said rectifier means includes a resistor connected between said AC signal source and said detecting electrode, and said detecting electrode is connected to the control electrode of said active element;
a switching element connected to the output electrode of said active element,
a control device connected to said switching element; and
a fuel supply control means controlled by said control device to supply fuel to said burner when a flame is present in said flame position.

4,088,985

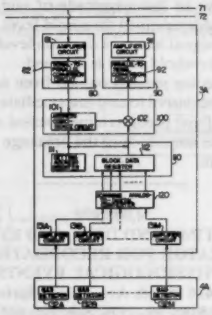
CENTRALIZED MONITORING SYSTEM FOR GAS LEAKAGE

Mitsuru Saito, Tokyo; Toshihide Nakamura, and Shinichi Ogura, both of Niihama, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Riken Keiki Fine Instrument Co., Ltd., Tokyo, both of, Japan

Filed Aug. 23, 1976, Ser. No. 716,556
Claims priority, application Japan, Oct. 3, 1975, 50-120006
Int. Cl.[2] G08B 21/00
U.S. Cl. 340—237 R **5 Claims**

1. A centralized monitoring system for gas leakage comprising:
a plurality of gas leakage detectors disposed in an area, each generating an analog signal representing concentration of the gas at each sensing point, said plurality of gas leakage detectors being formed into a plurality of groups;
a plurality of remote terminal units each connected to a corresponding one of said plurality of groups of gas leakage detectors, each said remote terminal units having a scanning analog-to-digital converter for scanning and converting the analog signals of said group of gas leakage detectors into digitally coded block data signals;
a loop line having a pair of cables for connecting said plurality of remote terminal units in a loop; and
a central monitoring station connected to said loop line for receiving said block data signals from each remote terminal unit together with an address code assigned to said remote terminal unit over said loop line on a time division basis in response to an instruction from the central moni-

toring station, said central monitoring station including a monitor unit for comparing the received block data signals with a predetermined monitoring level and for displaying the status of gas leakage.

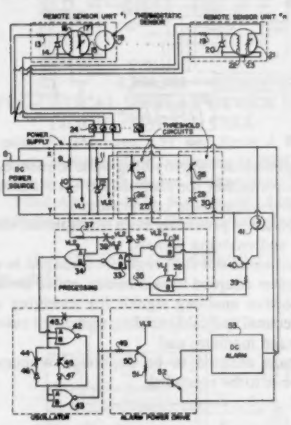


4,088,986

SMOKE, FIRE AND GAS ALARM WITH REMOTE SENSING, BACK-UP EMERGENCY POWER, AND SYSTEM SELF MONITORING

Charles E. Boucher, 423 Lucier St., Murphysboro, Ill. 62966

Filed Oct. 1, 1976, Ser. No. 728,813
Int. Cl.² G08B *21/00*
U.S. Cl. 340—237 S **16 Claims**



1. A smoke, fire and gas alarm characterized by a plurality of remote sensors and a central control and alarm unit, comprising:

A. a plurality of remote gas sensing means which respond to the presence of carbon monoxide and the like by a lowered electrical resistance; and

B. a centralized power supply operable for generating a D.C. supply voltage to each of said remote sensors, and for generating further distinct voltage levels VL1 and VL2, said power supply being characterized by a normal supply source and an alternate supply source, and including automatic means to switch therebetween; and

C. centralized threshold circuits for each of said remote sensors, each threshold circuit being adapted to compare said voltage level VL2 with a voltage from its associated sensor to produce a sensor output voltage; and

D. a centralized processing unit for receiving a sensor output voltage from each of said threshold circuits, said processing unit comprising logic element means for comparing each of said plurality of sensor output voltages with said voltage levels VL1 and VL2, said logic means further being adapted for generating an enabling processing unit output signal in response to either increase or a decrease of any of said sensor output voltages; and

E. a centralized alarm power drive for receiving said processing unit output signal, said alarm drive comprising a oscillator for generating a variable alarm signal; and

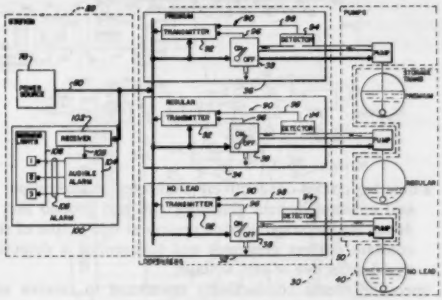
F. a centralized alarm, responsive to said alarm signal, and further comprising an interruptor device having means to prevent ignition of an explosive gas in the vicinity of said alarm.

4,088,987

FLUID LEAK ALARM SYSTEM

Glen Leroy Resler, 1015 Stuart St., Longmont, Colo. 80501, and Gerald Lance Schlatter, 1840 N. 55 St., Box 346, Boulder, Colo. 80301

Filed Jun. 24, 1976, Ser. No. 699,485
Int. Cl.² G08B *21/00*
U.S. Cl. 340—242 **44 Claims**



1. An alarm system for detecting a leak in a fluid delivery line, said system comprising:

an alarm,

a detector,

a power line interconnecting said alarm with said detector,

said detector being cooperative with the pressure of fluid in said delivery line dropping below a predetermined value for extending a signal over said power line,

means in said detector for enabling said detector only during the time interval beginning with the flow of fluid in said delivery line and ending a predetermined amount of time after said flow stops, and

said alarm being receptive of said extended signal on said power line for becoming activated.

4,088,988

PERSONNEL CABLE TRANSPORT SAFETY SYSTEM

Philip H. Berger, 2250 Pheasant Way, Salt Lake City, Utah 84121

Continuation-in-part of Ser. No. 589,570, Jun. 23, 1975, Pat. No. 3,991,413. This application Jun. 10, 1976, Ser. No. 694,594
The portion of the term of this patent subsequent to Nov. 9, 1993, has been disclaimed.
Int. Cl.² G08B *21/00*
U.S. Cl. 340—267 R **24 Claims**

1. Detection apparatus comprising:

a power supply;

a constant current generator conductively connected to said power supply to receive electrical energy therefrom and having an output for supplying constant current electrical energy;

an output line conductively connected to said output of said constant current generator;

a ground line conductively connected to said constant current generator;

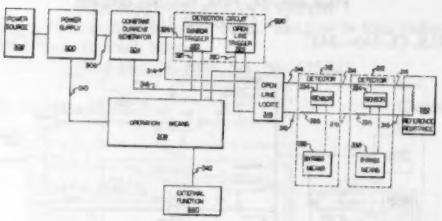
a plurality of detector means each conductively connected to said output line and said ground line, each of said detector means including:

a detector electrical resistance connected in series circuit in said output line,

sensor means conductively connected between said output line and said ground line, said sensor means being electrically nonconductive in the absence of external stimulus and becoming electrically conductive upon the incidence of external stimulus, and

bypass means which operates to bypass said sensor means, said bypass means including means cooperatively associated therewith to indicate that a sensor means is bypassed;

a reference electrical resistance conductively connected between said output line and said ground return line;



a detector circuit conductively connected to said output of said constant current generator and said ground line to detect the electrical voltage present at said output of said constant current generator and to generate a detection signal reflective of said voltage;

operation means conductively connected to receive said detection signal and operate in relation thereto; and

wherein said constant current generator supplies a constant electrical current at its output to said detector means and said reference electrical resistance resulting in the presence of a predictable voltage at the output of said constant current generator reflective of the total electrical resistance in the circuit of said output and said ground line so that upon the incidence of external stimulus the resulting electrical conduction of a sensor means causes a change in the total electrical resistance in circuit and a predictable change in the voltage at said output that is detected by said detector circuit which thereupon generates a detection signal that activates said operation means.

4,088,989

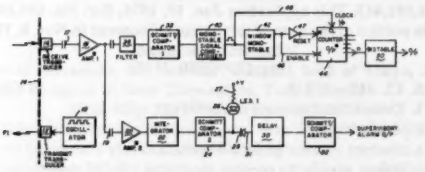
INTRUSION DETECTION APPARATUS

Elias E. Solomon, Duxbury, Mass., assignor to Gulf & Western Manufacturing Company, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,683

Int. Cl.[2] G08B *13/04*

U.S. Cl. 340—274 R **11 Claims**



7. A system for detecting the breakage or cutting of a glass panel or the like comprising;

a receiver transducer coupled to the panel and responsive to a breakage signal having components at random frequencies,

first detector means coupled from said receiver transducer and responsive to the magnitude of said breakage signal reaching a predetermined threshold level for providing an intermediate signal having a decision level persisting for as long as the threshold level is attained,

and second detector means coupled from said first detector means and responsive to said intermediate signal persisting for at least a fixed predetermined period of time and independent of the amplitude of the breakage signal for generating an alarm.

4,088,990

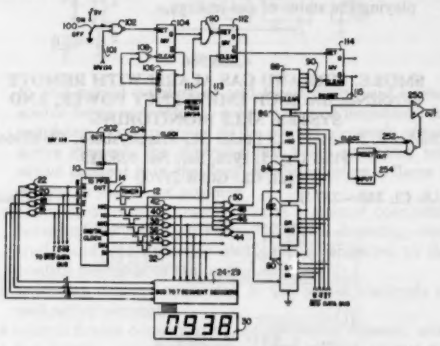
TIME OF DAY, TIME AND DATE AND EVENT NUMBER GENERATOR FOR RECORDATION OF PHYSIOLOGICAL EVENTS

Donald J. Sass, 9416 Worth Ave., Silver Spring, Md. 20901

Filed Mar. 10, 1976, Ser. No. 665,581

Int. Cl.[2] G06F *3/14*

U.S. Cl. 340—324 R **12 Claims**



1. A code generator for providing code sequences representing diverse information for recordation on a storage medium along with data acquisition, comprising:

a digital clock for providing both multiplexed binary coded decimal and enabling signals;

parallel load serial out shift registers arranged in series, each shift register coupled to said binary coded decimal signals and repective enabling signals for receiving said binary coded decimal and said enabling signals for recordation on said storage medium; and

switch means adapted to be depressed whenever a code sequence is to be recorded.

4,088,991

VISUAL DISPLAY BY ELECTRIC CONTROL OF SCATTERING OF LIGHT FROM A BEAM GUIDED BY AN ELASTOMER FILM

Kenneth Selig Sachar, White Plains, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,372

Int. Cl.[2] G06K *15/18*

U.S. Cl. 340—324 M **18 Claims**

1. A visual display panel, comprising:

a substrate of an electrically insulating material having a generally flat upper surface;

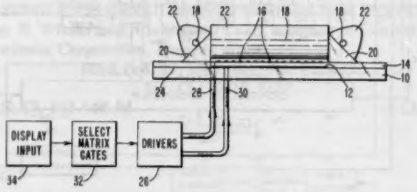
a plurality of lower, parallel conducting lines deposited on said upper surface of said substrate;

a transparent, deformable film of elastomer material on top of said lower conducting lines and said substrate;

a plurality of upper, parallel conducting lines deposited on the upper surface of said deformable elastomer film, said conducting lines extending in a direction substantially perpendicular to said lower conducting lines;

light source means for directing light into said deformable elastomer film near the edge portion thereof, said light being internally reflected within said elastomer film as it is propagated across the longitudinal length thereof;

means for providing a voltage difference across selected



pairs of said upper and lower conducting lines to produce a deformation of said elastomer film and light scattering at the locations where the excited upper and lower lines cross over one another;

whereby said light is scattered at the location of said deformation and detected by an observer of the panel.

4,088,992

ELECTRO-OPTICAL DISPLAY DEVICE USING A LIQUID CRYSTAL CELL

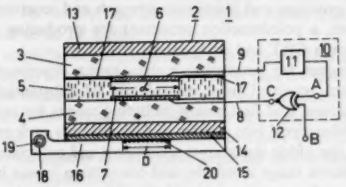
Allan R. Kmetz, Nussbaumen, CH, and Peter J. Wild, Wettingen, CH, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Apr. 30, 1976, Ser. No. 681,824

Claims priority, application Switzerland, Jun. 27, 1975, 8376/75

Int. Cl.² G02F *1/13*; G09F *9/32*

U.S. Cl. 340—336 **13 Claims**



1. An electro-optical display device, comprising:

a liquid crystal cell including two transparent plates bounding a liquid crystal layer and arranged between first and second polarizers;

a light source arranged on the side of one of the polarizers remote from said liquid crystal cell;

an electronic control device, coupled to said liquid crystal cell; and,

a diaphragm positioned on the side of one of the two plates of said liquid crystal cell which is adjacent to the liquid crystal layer, said diaphragm including an opening corresponding in form with the form of the desired symbol field of said liquid crystal cell for producing selective local illumination of said symbol field.

4,088,993

DEVICE FOR ENCODING A PLURALITY OF ANALOGICAL SIGNALS

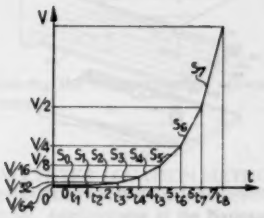
Gerard LeCardonnel; Pierre Gravez, and Rene Marc Favre, all of Paris, France, assignors to Thomson-CSF, Paris, France

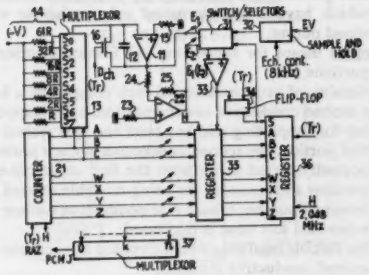
Filed Jun. 15, 1976, Ser. No. 696,416

Claims priority, application France, Jun. 20, 1975, 75 19409

Int. Cl.² H03K *13/20*

U.S. Cl. 340—347 AD **6 Claims**





1. A PCM encoder for encoding a plurality of parallel incoming analogical signals into a plurality of serially multiplexed output digital signals, which comprises:

means for counting the pulses of an external clock signal, and for delivering an internal digital signal comprising a first plurality of high-weight bits and a second plurality of low-weight bits;

means for delivering a succession of increasing voltages under the control of said high-weight bits;

means for integrating said increasing voltages, delivering a first slope voltage increasing from a zero value;

means for inverting said first slope voltage, delivering a second slope voltage decreasing from a zero value;

means for sampling and holding said incoming analogical signals, and for delivering a plurality of samples;

means for selecting one of said first and second slope voltages and successively each of said samples;

means for comparing the selected slope voltage and the selected sample, delivering a comparison bit marking the sign of the difference between said selected slope voltage and said selected sample;

means for storing said internal digital signal under the control of said comparison bit when said sign of said difference changes; and

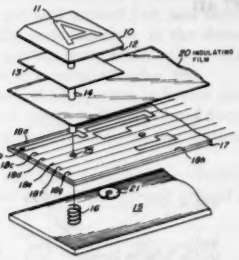
means for serializing the stored internal digital signal, and for delivering said serially multiplexed output digital signals.

4,088,994

PARALLELED OUTPUT SELF-ENCODING KEYBOARD

Steven Ralph McNay, Aurora, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 21, 1976, Ser. No. 678,810
Int. Cl.² G08C 1/00
U.S. Cl. 340—365 C **8 Claims**



1. A self-encoding keyboard arrangement comprising in combination:

a plurality of first conductive surface portions, certain of said portions having relatively larger and smaller areas which have a predetermined relationship to a desired signal output;

support means for supporting the first conductive surface portions;

a plurality of key mechanisms, each comprising a key head, a second conductive surface portion, and a support member for supporting said key head and said second conductive portion, the second conductive surface portion being normally biased away from the first conductive surface portions and mounted for being movable toward a predetermined number of said first conductive surface portions when said key head is depressed;

a thin flexible insulating film interposed between the first and second conductive portions;

a signal source coupled to the first conductive surface portions when said key head is fully depressed; and

a plurality of detectors, at least one of said detectors being coupled to each one of the first conductive surface portions for detecting a predetermined signal level on said first conductive portion in response to coupling between a relatively large area of said first conductive surface portion and the adjacent second conductive portion when the corresponding one of said key heads is depressed.

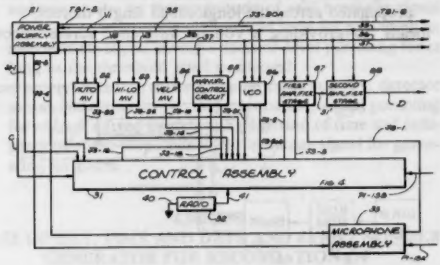
4,088,995

SYSTEM FOR SELECTIVELY OPERABLE DUAL SIMULTANEOUS SIREN BROADCAST FROM A SINGLE SPEAKER

C. Alfred Paladino, Costa Mesa, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 25, 1977, Ser. No. 772,067
Int. Cl.² G08B 3/00
U.S. Cl. 340—384 E **1 Claim**

1. A sound communication system comprising: a first modulating oscillator having a first output lead, said first modulating oscillator producing a first signal on said first output lead thereof; a second modulating oscillator having a second output lead, said second modulating oscillator producing a second signal on said second output lead thereof, different from said first signal; a first voltage controlled oscillator (VCO) having a first input lead and a third output lead, said first VCO producing a third signal on said third output lead; a second VCO having a second input lead and a fourth output lead, said second VCO producing a fourth signal on said fourth output lead; a loudspeaker having an input lead, said first output lead being connected to said first input lead, said second output lead being connected to said second input lead; and means connected from said third output lead and said fourth output lead to said loudspeaker input lead for impressing a signal upon said loudspeaker input lead directly proportional to the sum of said third and fourth signals.

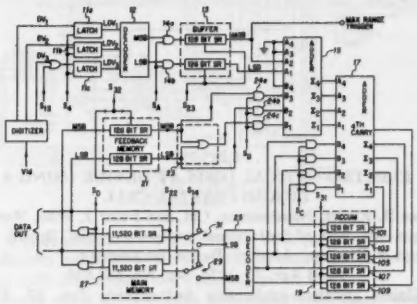


4,088,996

RADAR SIGNAL PROCESSOR

Marvin L. Hooker, Jr., Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 2, 1976, Ser. No. 720,165
Int. Cl.² G01S 9/02, 9/06
U.S. Cl. 343—5 VQ **7 Claims**



3. For use in a radar system having an antenna repetitively scanning through M number of successive, substantially fixed antenna positions and illuminating targets and receiving return therefrom, a postdetection processor for producing data for display on a CRT and comprising:

first means for producing a data group representative of return received from one of said M substantially fixed positions, said first means including means for converting a video signal into a series of digital words each representing the video signal over a different and associated one of adjacent range intervals, said conversion means including means for ensuring, should the video amplitude exceed a predetermined amplitude at any time during a given range interval, that a digital indication of video signal presence is provided by said conversion means at the end of said given range interval,

second means, including memory means, for storing said data group, said memory means being capable of retaining in memory M data groups which correspond respectively to the M successive antenna positions,

said first means including summing means, and means causing to be introduced at said summing means for summing (a) data representative of return received during an antenna scan I from a Jth one of said M positions and (b) data representative of the data group in said memory means which was produced previously during the preceding scan (I-1) and which corresponds to said Jth antenna

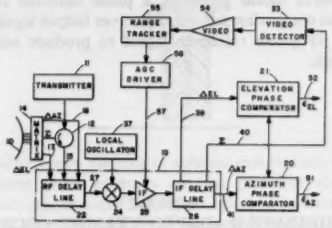
position, said causing means causing similar summing for each of the other antenna positions.

4,088,997

SINGLE CHANNEL MONOPULSE RADAR SYSTEM

Jay B. Winderman, Claremont, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Feb. 28, 1977, Ser. No. 772,623
Int. Cl.[2] G01S 9/22
U.S. Cl. 343—16 M **5 Claims**



1. A single channel monopulse radar system, comprising

an antenna for transmitting and receiving pulsed radar signals,

an arithmetic matrix for providing a pulsed sum information signal, a pulsed azimuth difference information signal and a pulsed elevation difference information signal in response to the pulsed radar signals transmitted and received by the antenna, wherein said information signals are RF signals;

an azimuth phase comparator for comparing the sum signal to the azimuth difference signal to provide an azimuth angle error signal;

an elevation phase comparator for comparing the sum signal to the elevation difference signal to provide an elevation angle error signal;

wherein the improvement comprises:

an RF delay line for separately delaying the pulsed sum and difference information signals so as to provide a multiplexed signal in which the three pulsed information signals appear serially and are closely spaced in time;

a mixer for converting the multiplexed signal from an RF signal to an IF signal;

an IF amplifier for amplifying the multiplexed IF signal; and

an IF delay line having separate output taps for restoring the phase relationship between the pulsed sum and difference information signals contained in the amplified, multiplexed, IF signal and for simultaneously providing said restored signals at respective separate output taps to the phase comparators.

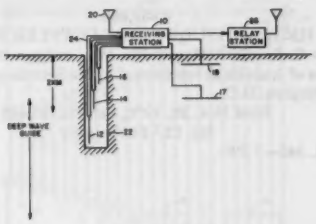
4,088,998

SYSTEM FOR DETECTING NUCLEAR EXPLOSIONS

Lucien E. Rawls, Leesburg, Va., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 22, 1960, Ser. No. 77,636
Int. Cl.[2] G01S 5/06; H04B 13/02; H01Q 1/04
U.S. Cl. 343—112 R **4 Claims**

1. Apparatus for detecting underground nuclear explosions comprising antenna means located in the dielectric substance of a deep waveguide in the earth and adapted to detect low frequency electromagnetic waves generated by a nuclear explosion, said deep waveguide comprising the high conductivity upper sedimentary layers of the earth, the dielectric basement rock, and a high conductivity layer of basement rock due to the increased temperature thereof at great depths, and



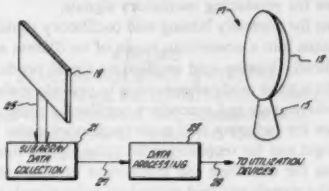
means for receiving the electromagnetic waves detected by said antenna means.

4,088,999

RF BEAM CENTER LOCATION METHOD AND APPARATUS FOR POWER TRANSMISSION SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Richard M. Dickinson, La Crescenta, Calif.

Filed May 21, 1976, Ser. No. 688,852
Int. Cl.[2] G01S 5/02
U.S. Cl. 343—113 R **8 Claims**



1. In an RF power transmission system wherein an energy source generates an energy beam towards a receiving structure, apparatus for locating the center of the energy beam incident on said receiving structure, said apparatus comprising:

a planar array of RF receiver elements arranged about a physical center in a matrix pattern;

means for providing signals indicative of the energy received by each of said receiver elements;

means for summing the signal quantities for all the receiver elements to the right of a predetermined vertical center line of said planar array to provide a right azimuth sum quantity;

means for summing the signal quantities for all the receiver elements to the left of a predetermined vertical center line of said planar array to provide a left azimuth sum quantity;

means for providing the difference and sum of said right and left azimuth sum quantities;

means for generating the ratio of the azimuth difference and sum, said ratio indicating the degrees that the center of the incident energy beam is off-center in azimuth from the predetermined vertical center line;

means for summing the signal quantities for all the receiver elements above a predetermined horizontal center line of said planar array to provide an above elevation sum quantity;

means for summing the signal quantities for all the receiver elements below a predetermined horizontal center line of said planar array to provide a below elevation sum quantity;

means for providing the difference and sum of said above and below elevation sum quantities; and

means for generating the ratio of the elevation difference and sum, said ratio indicating the degrees that the center

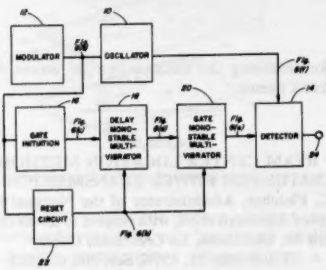
of the incident energy beam is off-center in elevation from the predetermined horizontal center line.

4,089,000

HIGH ALTITUDE PULSE DOPPLER FUZE

William C. Bradford, Hyattsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 20, 1970, Ser. No. 97,465
Int. Cl.[2] F42C *13/04*
U.S. Cl. 343—7 PF **4 Claims**



1. A high altitude pulse doppler ordnance fuze comprising means for producing oscillatory signals,

means for normally biasing said oscillatory signal producing means into a continuous mode of oscillation and for periodically biasing said oscillatory signal producing means into a pulse mode of operation to provide main oscillatory pulse signals and secondary oscillatory pulse signals,

means for radiating said main oscillatory pulse signals to a target and for receiving echo pulse signals therefrom, and

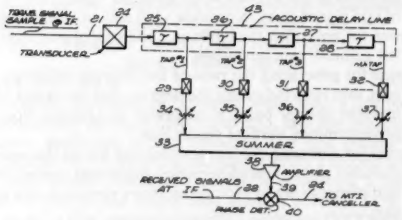
means for detecting the interaction of said received echo pulse signals and said secondary pulse signals to provide a signal indicative of the doppler effect between said target and said fuze.

4,089,001

RADAR MTI SYSTEM USING A NONCOHERENT TRANSMITTER

Thomas Harbison Donahue, Glendale, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed May 6, 1977, Ser. No. 794,472
Int. Cl.[2] G01S *9/42*
U.S. Cl. 343—7.7 **7 Claims**



1. A device for producing bipolar, phase compared MIT signals in a noncoherent MTI system which includes a pulsed RF transmitter and an echo signal receiver providing IF output signals comprising:

first means for deriving an IF pulse signal having instantaneous phase values continuously representative of the radio frequency phase over the duration of each transmitted RF pulse;

second means comprising a sonic delay line having an input and n taps spaced τ, where τ is substantially the duration of said transmitter pulses, and an electric-to-sonic signal transducer responsive to said first means output for driving the input of said delay line with a corresponding sonic pulse;

third means including a sonic-to-electric signal transducer connected to convert the sonic signal at each of said taps to a corresponding electric signal, and a summer circuit responsive to said electric signals to produce an IF phase reference signal $n\tau$ in duration at the output of said summer;

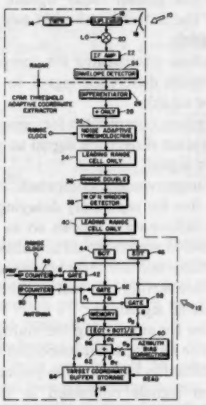
and fourth means including a phase detector circuit for phase comparing said echo receiver output signals against said IF phase reference signal to produce said bipolar signals.

4,089,002

CFAR THRESHOLD ADAPTIVE TARGET COORDINATE EXTRACTOR

Leo A. Kerr; Allen I. Sinsky, and Richard Gonsalves, all of Baltimore County, Md., assignors to The Bendix Corporation, Southfield, Mich.

Filed Apr. 5, 1977, Ser. No. 784,762
Int. Cl.[2] G01S *7/44*
U.S. Cl. 343—11 R **4 Claims**



1. A target coordinate extractor for a radar system which transmits a plurality of pulses at various contiguous scanning angles comprising a plurality of scans and including a radar receiver having a range clock, means for detecting the envelope of a radar target return signal comprising:

means responsive to said range clock for generating a range cell signal comprised of at least a single range cell and defining the peak of said envelope;

means for adding at least a contiguous range cell to said range cell signal, implying the presence of a target return in each of the range cells of said range cell signal;

an M of N window detector, where M and N are integers; for detecting the presence of a target return in at least M range cells at a certain fixed range in N contiguous scans; and,

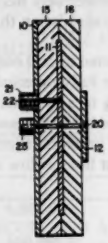
means responsive to the output signals from said window detector for determining the angular location of said radar target.

4,089,003

MULTIFREQUENCY MICROSTRIP ANTENNA

Peter J. Conroy, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 7, 1977, Ser. No. 766,099
Int. Cl.[2] H01Q 13/10, 1/28
U.S. Cl. 343—700 MS 6 Claims



1. Multifrequency microstrip antenna means comprising:
(a) at least three generally circular plates of electrically conducting material mounted generally coaxially in spaced apart relationship with dielectric material therebetween;
(b) a first plate of said three plates being electrically connected to a reference potential and forming a ground plane for a first microstrip antenna resonant at a first frequency;
(c) a second plate of said three plates positioned adjacent said first plate for serving as an antenna element and forming the first microstrip antenna in conjuction with said first plate, said second plate further forming a ground plane for a second microstrip antenna resonant at a second frequency;
(d) a third plate of said three plates positioned adjacent said second plate for serving as an antenna element and forming the second microstrip antenna in conjunction with said second plate; and
(e) means connected to said second plate for feeding said first microwave antenna and means connected to said third plate for feeding said second microwave antenna, and each of said second and third plates being electrically connected to said first plate at approximately the centers thereof.

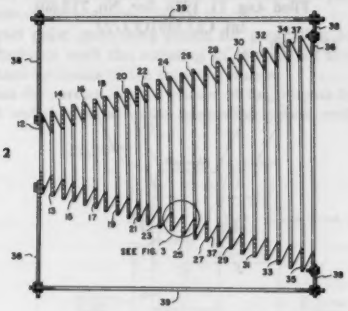
4,089,004

COLLAPSIBLE CORRUGATED HORN ANTENNA

Donald E. Barthlome, Hampton, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 20, 1977, Ser. No. 799,025
Int. Cl.[2] H01Q 13/02
U.S. Cl. 343—786 8 Claims

1. A collapsible corrugated horn antenna comprising:
a plurality of rigid flat thin metal pieces with each piece having a hole in it the same shape as the holes in all other pieces but having a size different from the sizes of the holes in all other pieces;
said metal pieces arranged in a sequence such that the metal piece having the smallest hole is first and such that all other metal pieces has a hole larger than the hole in the metal piece that precedes it in the sequence; and



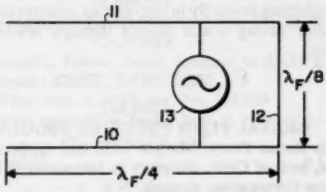
a plurality of flexible electrically conductive members attaching successive metal pieces together physically and connecting them together electrically.

4,089,005

DUAL FREQUENCY ANTENNA

Raymond G. Immell, Mesa, and Bill H. Sasser, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 10, 1977, Ser. No. 758,247
Int. Cl.[2] H01Q 9/00
U.S. Cl. 343—845 6 Claims



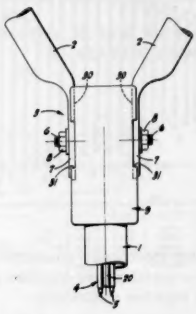
1. An antenna constructed to operate at a base frequency and an even harmonic frequency, said antenna comprising:
(a) first and second, spaced apart, electrically conductive elements;
(b) electrically conductive means connected between said first and second elements, providing an electrical short therebetween and positioned for forming a transmission line which is open circuited at one end and short circuited at the other end with the electrical characteristics of a quarter wavelength transmission line at the base frequency and a half wavelength transmission line at the harmonic frequency;
(c) antenna feed means connected between said first and second elements and spaced from said electrically conductive means for providing a predetermined impedance to said feed means; and
(d) the spacing of said first and second elements being sufficient to provide said antenna with the electrical characteristics of a monopole quarter wavelength antenna at the harmonic frequency.

4,089,006

MAST-SUPPORTED ANTENNA MOUNTING BLOCK

Lowell H. Morris, Dixon, Calif., assignor to Morris Manufacturing Company, Dixon, Calif.

Filed Aug. 11, 1976, Ser. No. 713,601
Int. Cl.[2] H01Q 1/12
U.S. Cl. 343—890 2 Claims



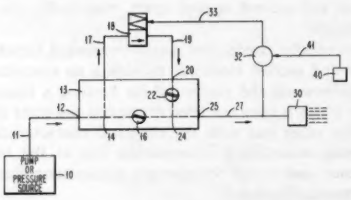
1. An improved block for an antenna unit which includes a tubular mast, a block engaged on the upper end of the mast, the block having a downwardly opening bore in which the upper end of the mast is received, antenna elements, bolts securing the antenna elements to the block, and an antenna lead extending upwardly in the mast and into the block, with the lead wires connected in the block to the bolts; characterized by said improved antenna mounting block comprising, in combination, initially separate but mating halves, said block-halves being rigidly secured together upon inclusion of such block in the antenna unit by engagement on the mast, means between the block and the antenna lead preventing relative motion therebetween, and means between the block and the bolts preventing rotation of the latter; said motion-preventing means between the block and lead comprising a tongue formed with the block and projecting inwardly in intersecting relation to the lead, and the latter having a slot therein through which the tongue projects.

4,089,007

DIGITAL FLOW PRESSURE REGULATOR

Francis James Perry, Morgan Hill, and Anthony Vesci, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 24, 1976, Ser. No. 689,702
Int. Cl.[2] G01D 15/16
U.S. Cl. 346—140 R 4 Claims



1. In an ink jet system including a head for projecting ink therefrom at a relatively constant low flow rate, and a source of ink at a high pressure, a pressure regulator for reducing and regulating the pressure of said ink at an output connected to said head, comprising:

a primary orifice connected between said source and said output for continuous transmission of said ink therethrough to said output at an output pressure of a predetermined low value;

a binary orifice connectable between said source and said output for transmission of said ink therethrough at said output at a flow such that continuous transmission therethrough in conjunction with said transmission from said primary orifice to said output produce an output pressure of a predetermined high value;

a binary valve for selectively fully opening and fully shutting off said ink transmission through said binary orifice; and

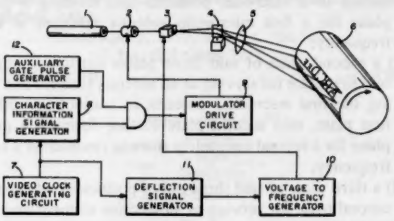
sensor means connected to said output and responsive to said output pressure to fully open said binary valve upon said pressure dropping to a predetermined minimum value at least as high as said low value and to fully close said binary valve upon said pressure climbing to a predetermined maximum value at least as low as said high value.

4,089,008

OPTICAL PRINTER WITH CHARACTER MAGNIFICATION

Gojiro Suga, and Takashi Hirasaki, both of Tokyo, Japan, assignors to Xerox Corporation, Stamford, Conn.

Filed Jun. 14, 1976, Ser. No. 695,680
Int. Cl.[2] H04N 5/80, 5/84; G03B 23/00
U.S. Cl. 354—5 1 Claim



1. An optical printer comprising: an illumination source generating a beam of light, a recording medium, a main scanning member in the path of said beam for scanning said beam at a fixed speed in a main direction across said recording medium, an acousto-optic deflector located in the path of said beam between said main scanning member and said illumination source, said deflector scanning said beam onto said main scanning member in a direction transverse to said main direction, a deflection signal generator operatively connected to said deflector for adjusting the stroke length of auxiliary scanning in accordance with the magnification ratio of a character to be printed and for simultaneously adjusting the frequency of auxiliary scanning by the reciprocal of the magnification ratio of the character to be printed.

4,089,009

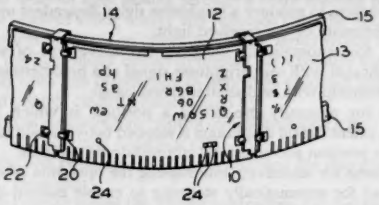
FONT FASTENING MEANS

Clifford John Frazier, Wilmette, Ill., assignor to Castcraft Industries, Inc., Chicago, Ill.

Filed Jan. 19, 1977, Ser. No. 760,562
Int. Cl.[2] G03B 15/00
U.S. Cl. 354—15 10 Claims

10. In combination with a phototypesetting apparatus of the type wherein a film matrix is mounted on a rotatable cylindrical drum having at least two pairs of members protruding from the periphery of said drum, and wherein said film matrix is initially impaled on one member of each pair protruding from said drum, the improvement comprising:

a clip for securely mounting said film matrix on said drum, said clip adapted to grip said drum and to bear against said



film matrix when inserted between a pair of said protruding members.

4,089,010

DISPLAY CIRCUIT FOR A CAMERA

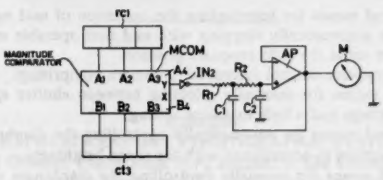
Tadashi Ito; Nobuaki Sakurada, both of Yokohama; Masaharu Kawamura, Hino; Nobuhiko Shinoda, Tokyo; Fumio Ito, Yokohama, and Hiroyashu Murakami, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1976, Ser. No. 728,161

Claims priority, application Japan, Oct. 2, 1975, 50-119388

Int. Cl.[2] G03B *7/08, 17/20*

U.S. Cl. 354—23 D **8 Claims**



1. A display circuit for a camera comprising:

(a) an exposure information producing circuit for producing a digital value corresponding to exposure information;

(b) a storing means for storing the digital value produced by said exposure information producing circuit;

(c) a pulse signal producing circuit coupled to said storing means for producing a pulse signal with a duty cycle corresponding to the digital value produced by said exposure information producing circuit; and

(d) a meter coupled to said pulse signal producing circuit for displaying the exposure information.

4,089,011

EXPOSURE INFORMATION SETTING DEVICE FOR CAMERA

Nobuaki Date, Kawaski; Yoshiaki Watanabe, Fujisawa; Akio Sunouchi; Yukio Mashimo, both of Tokyo; Fumio Ito, and Tadashi Ito, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 1, 1976, Ser. No. 737,345

Claims priority, application Japan, Nov. 4, 1975, 50-132304

Int. Cl.[2] G03B *7/08, 17/00*

U.S. Cl. 354—23 D **5 Claims**

1. An exposure information setting device for a camera comprising:

a photographic information setting means;

a first comb tooth shaped conductor pattern;

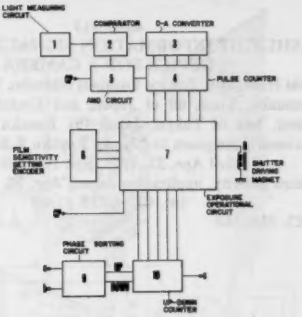
a second comb tooth shaped conductor pattern, said pattern being arranged in parallel with the first conductor pattern in such a manner that a phase difference takes place between the first and said conductor pattern;

a scanning means for scanning the first and the second conductor pattern, said means being operable in functional engagement with the photographic information setting means;

a first pulse generating means for generating pulses in accordance with the scanning of the first conductor pattern by means of the scanning means;

a second pulse generating means for generating pulses in accordance with the scanning of the second conductor pattern by means of the scanning means;

a means for sorting out the phases of the outputs from the first and the second pulse generating pulses, said means



including a first signal generating means and a second signal generating means, whereby either the first or the second signal generating means in operated in accordance with the phase sorting;

an up - down counter for carrying out the counting in accordance with the output of the first or the second signal generating means; and

an exposure operation means for obtaining the exposure value in accordance with the value counted by the up-down counter.

4,089,012

DIGITAL EXPOSURE TIME INDICATING CIRCUIT FOR CAMERA

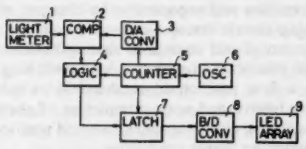
Masahiro Kawasaki, Tokyo, Japan, assignor to Asahi Koguku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1976, Ser. No. 738,994

Claims priority, application Japan, Nov. 6, 1975, 50-133375

Int. Cl.[2] G03B *7/08*

U.S. Cl. 354—23 D **6 Claims**



1. A digital indicating circuit for a camera, comprising:

(a) an oscillator;

(b) a digital counter for counting the number of pulses generated by said oscillator;

(c) a latch circuit for storing, on command, the digital value obtained from said counter;

(d) an array of visual indicating elements;

(e) a decoder circuit for energizing an indicating element in accordance with the digital value stored in said latch circuit;

(f) A D/A convertor for converting the digital value obtained from said counter into an analog value;

(g) a light detector for producing an analog output signal proportional to an unknown photographic parameter as a

function of preset photographic parameters and a detected brightness level;

(h) a comparator for comparing the analog outputs of said D/A converter and said light detector; and

(i) logic circuit means responsive to the comparator for commanding the latch circuit to store the value obtained from said counter at an interval of approximately a half cycle of a pulse generated in said oscillator after the output of said D/A converter reaches the amplitude level of the output signal from said light detector.

4,089,013

FLASHLIGHT INFORMATION SIGNAL GENERATING DEVICE FOR A CAMERA

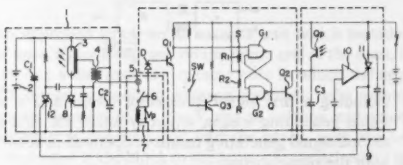
Hiroshi Hasegawa, Tokyo; Yoshiaki Ohtsubo, Kawasaki; Sakuji Watanabe, Yono, all of Japan, and Kouichi Takahata, deceased, late of Tokyo, Japan (by Kosaku Takahata, legal successor), assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Apr. 21, 1977, Ser. No. 789,541

Claims priority, application Japan, Apr. 30, 1976, 51-48473

Int. Cl.² G03B *15/05*

U.S. Cl. 354—33 **2 Claims**



1. In a camera having a light receiving element for receiving extraneous light, an integrating capacitor series-connected to said light receiving element, a control circuit for supplying a stop signal to a flashlight device and connectable to said camera through a connection means connected between said camera and said flashlight device, to cause the flashlight discharge tube of said flashlight device to stop emitting when the terminal of said capacitor has reached a predetermined value, and a synchro circuit having a synchro terminal and X-contact, the combination therewith comprising:

a coil series-connected to said X-contact and excitable by a current flowing from said flashlight device through said synchro terminal and X-contact to generate a voltage when said flashlight discharge tube has started to emit;

switching means parallel-connected to said integrating capacitor so that in its conductive position said switching means enables said capacitor to be charged; and

a switching circuit connected to said coil and the release mechanism of said camera so that upon detection of the voltage generated in said coil, said switching circuit assumes a first position to render said switching means non-conductive and upon completion of shutter release, said switching circuit assumes a second position to render said switching means conductive.

4,089,014

EXPOSURE CONTROL SYSTEM

Hiroshi Ueda, Nara, and Masatake Niwa, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 30, 1976, Ser. No. 745,993

Claims priority, application Japan, Dec. 10, 1975, 50-146330

Int. Cl.² G03B *7/08*

U.S. Cl. 354—38 **10 Claims**

1. Exposure control system for a camera comprising:

a first operable member for selecting shutter speed having a plurality of selectable positions including bulb exposure to generate a shutter speed signal corresponding to a selected position;

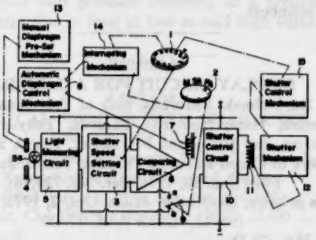
a diaphragm having a fully open position and movable upon camera release operation toward and fully stopped-down position;

a light measuring circuit for receiving light through said diaphragm to produce a brightness signal dependent upon the intensity of the received light;

means for automatically stopping the movement of said diaphragm with said brightness signal at a predetermined relationship with said shutter speed signal;

means for manually pre-setting a position at which the movement of said diaphragm is stopped between said fully open position and said fully stopped-down position;

first means for selectively interrupting the operation of said means for automatically stopping to enable manual diaphragm control; and



second means for interrupting the operation of said means for automatically stopping with said first operable member set at the bulb exposure position.

9. Exposure control system for a camera comprising:

first means for manually selecting between shutter speed settings and a bulb exposure setting;

second means for automatically controlling the diaphragm aperture in accordance with the scene brightness;

third means for manually controlling the diaphragm aperture;

fourth means for manually selecting between said second and third means; and

fifth means for selecting manual diaphragm control with the bulb exposure setting manually selected, irrespective of the selection by said fourth means.

4,089,015

DUAL FUNCTION EXPOSURE TIME DISPLAY AND CONTROL CIRCUIT FOR SLR CAMERA

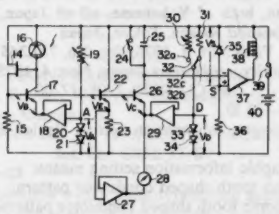
Naoyuki Uno, Urawa, and Masahiro Kawasaki, Tokyo, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 13, 1976, Ser. No. 750,344

Claims priority, application Japan, Dec. 17, 1975, 50-171113[U]

Int. Cl.² G03B *7/08, 7/00*

U.S. Cl. 354—51 **1 Claim**



1. In a TTL, single lens reflex, focal plane shutter camera wherein, with a reflex mirror raised, light passing through a stopped down lens diaphragm and reflected by a front shutter curtain or a film surface onto a light sensing element mounted

within the camera produces an object brightness signal which is applied to a light meter circuit to control the exposure time, and wherein light passing through a beam splitting portion of the lowered reflex mirror and reflected onto the light sensing element produces an object brightness signal which is applied to the light meter circuit to display the exposure time with a fully open lens diaphragm, an improved exposure time display and control circuit, characterized by:

(a) an exposure time control circuit including a time integrating charging capacitor (25).

(b) first switch means (24) for enabling the charging of said capacitor,

(c) circuit means (26, 29) for controlling the charging rate of said capacitor,

(d) a variable resistor (30) for establishing a lens diaphragm stop value in an exposure time display mode,

(e) a fixed resistor (31) for establishing a lens diaphragm stop value in an exposure time control mode,

(f) second switch means (32) for connecting one of said resistors to an input of said charging control circuit and

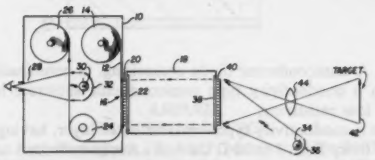
(g) means coordinated with the depression of the camera shutter release button for transferring said second switch means from said variable to said fixed resistor, and subsequently transferring said first switch means to enable the charging of said capacitor.

4,089,016

RAPID ACCESS DRY PHOTOGRAPHIC SYSTEM

Carl Orlando, Tinton Falls, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 17, 1976, Ser. No. 742,969
Int. Cl.[2] G03B *17/50*
U.S. Cl. 354—75 **11 Claims**



1. Apparatus for producing rapid access dry photography imagery on dry emulsion photographic film, wherein the improvement comprises:

a film magazine having an image aperture adapted to receive an image of the target being photographed and including means for moving said film past said aperture for making a photographic exposure;

a lens directing light from said target toward said aperture;

image intensifier means optically coupled to said aperture being operative to collect and amplify light received from said target and lens to provide an intensified image to said aperture; and

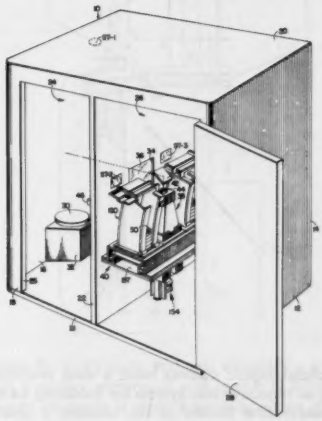
means impinging a relatively low light level uniform non-imaging light energy on said film at the time the exposure is made, the intensity of said low light level energy being 1/10 to 1/100th of the light intensity through said lens from said target thereby providing photon amplification, the combination of image intensification and photon amplification enhancing the relative sensitivity of said dry emulsion film to that of a wet emulsion film.

4,089,017

AUTOMATIC PHOTOSTUDIO

Daniel A. Buldini, Melrose, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sep. 7, 1976, Ser. No. 721,111
Int. Cl.[2] G03B *17/50*
U.S. Cl. 354—81 **30 Claims**



1. A cassette changing apparatus operable during a cassette changing cycle of operation for changing a film cassette in a camera of the type including a receptacle for receiving a film cassette holding a stack of film units therein and for locating the cassette in operative relation with the camera for exposing the forwardmost film unit in the stack, the camera receptacle having an opening therein for admitting and removing such a cassette, said cassette changing apparatus comprising:

first and second cassette holding magazines each configured to hold a stack of such cassettes therein and including an opening through which the cassettes are adapted to be dispensed sequentially for transfer to the camera receptacle;

a cassette carrier mounted for movement toward and away from the camera receptacle between operative positions including a cassette receiving position and being operable during a cassette changing cycle for removing an empty film cassette from the receptacle through the receptacle opening, effecting the disposal of the empty cassette, receiving a full cassette initially held in one of said first and second magazines and moving the full cassette through the receptacle opening and into its operative position within the receptacle;

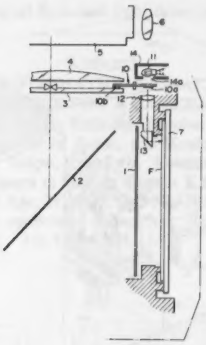
guide means for guiding the movement of the cassettes dispensed thereonto from said first and second magazines to said cassette carrier located in said cassette receiving position; and

means operable during a cassette changing cycle for effecting the dispensing of a cassette from one of said first and second magazines onto said guide means and for moving a cassette, dispensed onto said guide means from the other of said first and second magazines during the preceding cassette changing cycle, along said guide means and into operative relation with said cassette carrier located in said cassette receiving position, said means for effecting the dispensing of a cassette being operable to cause a cassette to be dispensed alternately from said first and second magazines during successive cassette changing cycles.

4,089,018
DATA RECORDING CAMERA

Seiji Asano, Okegawa, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Jun. 16, 1977, Ser. No. 807,292
Claims priority, application Japan, Jun. 16, 1976, 51-70807
Int. Cl.[2] G03B *17/24*
U.S. Cl. 354—106 21 Claims

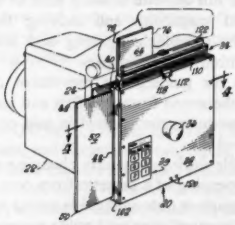


1. A photographic camera with a data recording means including an objective lens system for focussing an image on a photosensitive film loaded in the camera, a shutter means disposed between said objective lens system and said film, and a viewfinder system for viewing the object to be photographed, wherein said data recording means comprises a data carrying means carrying thereon data representing characters, a light source means for illuminating said data carrying means and a data projecting optical system for projecting an image of said data representing characters onto said film so that the image is photographically recorded thereon, said data projecting optical system including an optical path changing means for changing the direction of the light from said data carrying means toward the film which is positioned between the film and said shutter means within the optical path of said objective lens system at least when the data recording means is operated, said data carrying means being operable from outside of the camera to select the data to be recorded.

4,089,019
MULTI-IMAGE CASSETTE HOLDER

Roelof R. Jonker, 15912 Maybrook St., Westminister, Calif. 92683

Filed Jun. 9, 1976, Ser. No. 694,299
Int. Cl.[2] G03B *1/00, 27/44*
U.S. Cl. 354—124 9 Claims



1. A holder for a radiation sensitive medium which enables selected portions of the medium to be exposed by an imaging system at different times, the improvement comprising:

adapter means for securing said holder to the imaging system;

first attachment means having a first portion connected to said adapter means and a second portion adapted to slide in a first direction along a plane parallel to said medium with respect to said first portion;

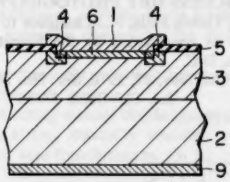
second attachment means connected to said first attachment means, said second attachment means having a first portion connected to said first attachment means second portion and adapted to slide in a second direction along a plane parallel to said medium with respect to said second attachment means first portion; and

means retaining said medium connected to said second portion of said second attachment means, said first portion of said second attachment means including a first radiation shield defining an opening therethrough which is substantially larger than the size of a selected portion of the medium in said first direction, and said first portion of said first attachment means including a second radiation shield defining an opening substantially the same size as a selected portion of the medium, said second radiation shield being of a size in said first direction to prevent radiation from reaching the medium except as the selected portion when said medium is moved in said first direction, said first radiation shield being substantially larger than the size of a selected portion of the medium in said first direction so that when said medium is moved in said second direction, radiation can reach said medium only at said selected portion.

4,089,020
HIGH POWER SEMICONDUCTOR DIODE

Takahide Ikeda, Kodaira, and Michio Ishikawa, Hachioji, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 16, 1976, Ser. No. 677,807
Claims priority, application Japan, Apr. 16, 1975, 50-45282
Int. Cl.[2] H01L *29/48, 29/56, 29/64*
U.S. Cl. 357—15 4 Claims



1. A semiconductor diode comprising, in combination:

an *n* conductivity type semiconductor substrate having a low resistivity;

an *n* conductivity type semiconductor layer, having a resistivity from 1 to 20 Ω cm and a thickness from 4 to 15 μm, disposed on the surface of said substrate;

a *p* conductivity type semiconductor layer, having a maximum thickness of 5 μm and an impurity concentration per unit area from 10^{11} to 10^{13} cm^{-2}, disposed at the surface of said *n* conductivity type semiconductor layer;

a first electrode forming a Schottky barrier contact with said *p* conductivity type semiconductor layer; and

an electrode in ohmic contact with said substrate.

4,089,021
SEMICONDUCTOR DEVICE CAPABLE OF WITHSTANDING HIGH VOLTAGE AND METHOD OF MANUFACTURING SAME

Naonobu Sato, and Kaoru Shinnou, both of Kodaira, Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 3, 1976, Ser. No. 747,323
Claims priority, application Japan, Dec. 8, 1975, 50-145041
Int. Cl.[2] H01L *29/06, 29/72, 27/02, 27/04*
U.S. Cl. 357—20 11 Claims

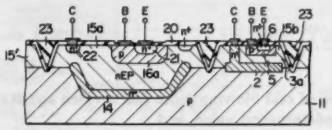
1. A semiconductor device capable of withstanding a high voltage comprising:

a semiconductor substrate of a first conductivity type, one major surface of said substrate being partly recessed to form at least one dish-shaped portion;

a low resistivity region of a second conductivity type formed in the surface of said dish-shaped portion of said one major surface of said substrate;

a semiconductor layer of said second conductivity type formed on said one major surface of said substrate and on said low resistivity region and having a plain surface, said low resistivity region being buried in said substrate and in said semiconductor layer; and

at least one isolation region formed in said semiconductor layer, said isolation region extending from the surface of said semiconductor layer to reach that portion of said one



major surface of said substrate which is not recessed, thereby defining at least one isolated dish-shaped island in said semiconductor layer;

wherein said dish-shaped island includes a bipolar transistor having a first base region of said first conductivity type in a first portion of the surface of said dish-shaped island in said semiconductor layer, a first emitter region of said second conductivity type formed in the surface of said base region, and a first collector leading region formed in a second portion of the surface of said dish-shaped island, the remaining portion of said dish-shaped island serving as a collector region;

in which said collector leading region extends to be in contact with said buried low resistivity region.

4,089,022

ELECTRON DEVICE

Shojiro Asai, Kanagawa; Toshiaki Masuhara, Hachioji, and Kenji Kaneko, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 24, 1976, Ser. No. 744,864

Claims priority, application Japan, Dec. 5, 1975, 50-143995

Int. Cl.² H01L *29/78*

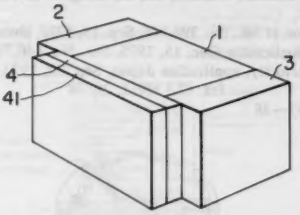
U.S. Cl. 357—23 **16 Claims**

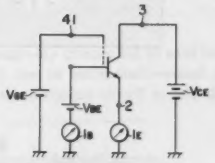
1. An electron device comprising

(i) a semiconductor element which includes a semiconductor region A of a first conductivity type, a semiconductor region B of a second conductivity type adjoining said region A, and a semiconductor region C of said second conductivity type adjoining said region A and isolated from said region B by said region A, said regions A, B, and C being made by single crystal silicon, and in which on a surface extending from said region B via said region A to said region C, a gate electrode is provided through an insulating film,

(ii) means for applying a forward bias voltage of at most 0.6V between said region A and said region B,

(iii) means for applying a voltage between said region C and said region B by which a potential relative to the minority carriers existing in said region A becomes lower in said region C than in said region B, and





(iv) means for applying to said gate electrode a potential by which a surface portion of said region A directly under said gate electrode is made a weak-inversion region.

4,089,023

TWO-PHASE CHARGE-COUPLED SEMICONDUCTOR ARRANGEMENT

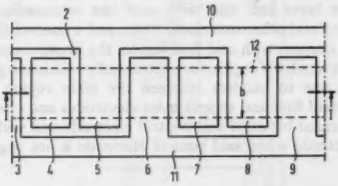
Reinhard Losehand, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jul. 8, 1976, Ser. No. 703,535

Claims priority, application Germany, Jul. 22, 1975, 2532789

Int. Cl.² H01L *29/78, 29/04;* G11C *19/28*

U.S. Cl. 357—24 **4 Claims**

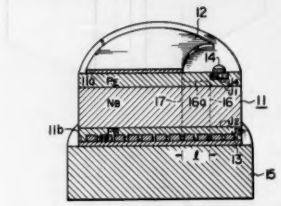


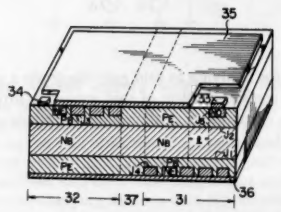
1. A semiconductor charge-coupled arrangement comprising a substrate of semiconductor material having an insulator layer formed on one surface thereof and three successions of electrodes formed on said insulator layer, one electrode of each succession respectively forming a group below which an asymmetric potential well is produced in the substrate, a conductor path interconnecting the electrodes of a first succession of electrodes, a second conductor path interconnecting the electrodes of a second succession of electrodes, said first and second successions of electrodes being the only successions in which the electrodes of such successions are connected together in their respective succession by a conductor path, a high resistance layer overlying the electrodes of all three successions, all three successions being coupled to each other by said high resistance layer and to said substrate by the capacitance formed by the respective electrodes with the insulating layer and the substrate.

4,089,024
SEMICONDUCTOR SWITCHING DEVICE

Tomoyuki Tanaka, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Continuation of Ser. No. 398,446, Sep. 18, 1973, abandoned. This application Dec. 15, 1975, Ser. No. 640,714
Claims priority, application Japan, Sep. 20, 1972, 47-93623
Int. Cl.² H01L 29/74
U.S. Cl. 357—38 21 Claims





1. In a semiconductor switching device comprising four semiconductor layers formed one upon another each having a conductivity type different from the adjacent layer to constitute three P-N junctions, a first region formed in a part of the surface of one of the outermost layers and having a conductivity type different from that of said one outermost layer, a part of one intermediate layer adjacent to the other outermost layer being exposed to the surface of said other outermost layer, a first main electrode in ohmic contact with said one outermost layer, a second main electrode in ohmic contact with said other outermost layer and also with said one intermediate layer adjacent to said other outermost layer, and a control electrode in ohmic contact with said first region, the improvement comprising an auxiliary region for substantially eliminating mutual affection due to carriers between the main region formed between said first and second main electrodes and controlling region formed between said control electrode and said second main electrode when said control electrode is not triggered.

4,089,025
VIR SIGNAL DETECTOR FOR A COLOR TELEVISION RECEIVER

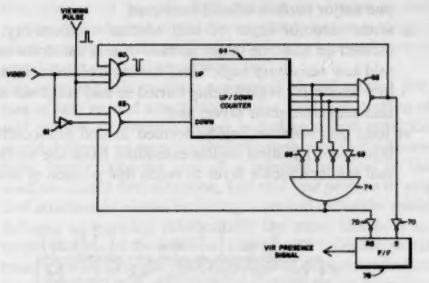
Robert O. Banker; Charles T. Brown, both of Portsmouth; Sanjar Ghaem-maghami, Chesapeake; Howard E. Holshouser, and Kenneth J. Wachter, both of Suffolk, all of Va., assignors to General Electric Company, Portsmouth, Va.

Filed Oct. 6, 1976, Ser. No. 730,238
Int. Cl.² H04N 9/62, 9/535
U.S. Cl. 358—10 9 Claims

1. In a color television receiver a VIR signal detector for identifying the presence of a VIR signal in a predetermined line of each field scan of the composite video signal, said signal detector having high immunity to Gaussian and pulse-type noise in said composite video signal, said signal detector comprising:

means for generating a viewing pulse during the portion of each predetermined line of a composite video signal in which a VIR signal may be present, said viewing pulse having a duration less than the duration of said VIR signal,

means responsive to said viewing pulse and the video signal to provide a presence indication upon simultaneous detection of said viewing pulse and a video signal exceeding a predetermined value, and

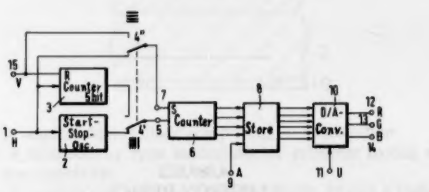


means for accumulating said presence indications and generating a VIR presence signal upon the accumulation of a predetermined number of presence indications.

4,089,026
COLOR BAR GENERATOR

Rudolf Wilhelm, Klein-Gerau, and Jurgen Heitmann, Seeheim, both of Germany, assignors to Robert Bosch GmbH, Germany

Filed Apr. 7, 1977, Ser. No. 785,764
Claims priority, application Germany, Apr. 10, 1976, 2615783
Int. Cl.² H04N 9/62
U.S. Cl. 358—10 14 Claims

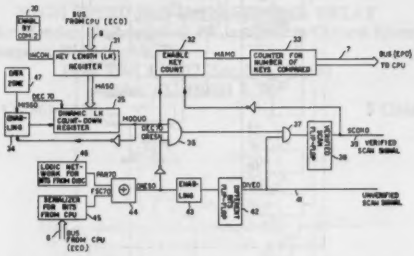


1. An apparatus for producing video frequency colour value signals which correspond to a desired arrangement of vertical colour bars on a television screen, comprising means for producing during each of a plurality of successive line periods a series of signals having a separation less than the line period, means for applying each series of signals so produced to a sequence generator adapted to generate a predetermined sequence of sets of binary signals in response to each series of signals, each set of binary signals being generated in response to a respective one of the series of signals, a signal translator adapted to provide a predetermined sequence of further sets of binary signals in response to each sequence of firstmentioned sets of binary signals, each further set of binary signals being produced in response to a respective one of the firstmentioned sets and having binary values determined by the values of the said respective firstmentioned set, and a digital-to-analogue converter adapted to derive from each sequence of further sets of binary signals of a sequence of sets of colour value signals, the sets of colour value signals corresponding to the colours of the desired colour bars.

4,089,027
ARRANGEMENT FOR RETRIEVING INFORMATION RECORDED ON A SEMI-RANDOM ACCESS RECORD CARRIER

Giorgio Grigoletti, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Mar. 31, 1976, Ser. No. 672,563
Claims priority, application Italy, Apr. 16, 1975, 67959/75
Int. Cl.[2] G11B *17/00, 21/08, 27/28*
U.S. Cl. 360—72 3 Claims



1. In a data processing system having a microprocessor for processing microprograms and a record carrier for storing records and index key words associated with the records, a record retrieval means controlled by said microprocessor for retrieving the records from said record carrier comprising:

comparing means for comparing in succession the index key words stored on said record carrier with a search key word provided by said microprocessor to indicate whether an index key word matches the search key word;

identifying means connected to said comparing means for identifying the position on said record carrier of the index key word which matches the search key word, wherein said microprocessor comprises record address calculating means responsive to the output of said identifying means for calculating the address of the record associated with the index key word which matches the search key word from the position on said record carrier of the index key words; and

accessing means controlled by said microprocessor for accessing the record on said record identified by the search key word.

4,089,028
METHOD AND APPARATUS FOR CONTROLLING EXTERNAL DEVICES AND FOR TRANSFERRING INFORMATION

William R. Wells, Linwood, N.J., assignor to United Audio Visual Corporation, Las Vegas, Nev.

Filed Mar. 20, 1975, Ser. No. 560,061
Int. Cl.[2] G03B *31/00*
U.S. Cl. 360—79 8 Claims

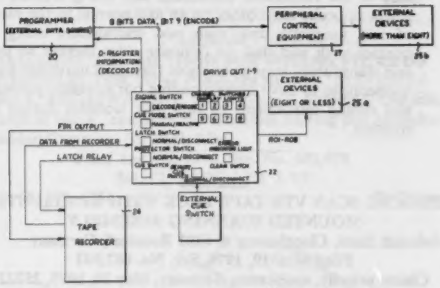
3. Apparatus for controlling one or more audio-visual devices in response to stored information in parallel bit format on a punched tape or in serial bit format on a magnetic tape, comprising:

first means for detecting said information stored in serial bit format on said magnetic tape and for generating a first set of digital signals in parallel bit format in response thereto;

second means for detecting said information stored on said punched tape in parallel bit format and for generating a second set of digital signals in parallel bit format in response thereto;

selectively actuatable means operatively connected to said first and second means for cuasing either said first means to detect said magnetic tape information and generate said first set of digital signals or said second means to detect said punched tape information and generate said second set of digital signals;

third means operatively connected to said first and second means for temporarily storing said first or second sets of digital signals; and

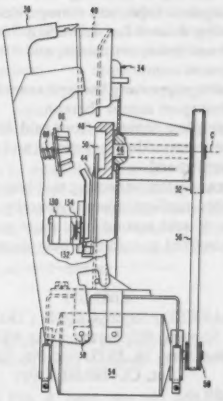


fourth means operatively connected to said third means for controlling said one or more audio-visual devices in response to said set of signals stored in said third means.

4,089,029
DATA STORAGE APPARATUS USING A FLEXIBLE MAGNETIC DISK

Daniel Owen Castrodale, Rochester, Minn.; William John Pendy, Jr., Atlanta, Ga., and William Stewart Wentink, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 570,118, Apr. 21, 1975, abandoned.
This application Mar. 10, 1977, Ser. No. 776,456
Int. Cl.[2] G11B *5/54, 5/60, 25/04*
U.S. Cl. 360—99 28 Claims



1. A magnetic storage device comprising:

a thin flexible magnetic disk which due to its flexibility is subject to wobbling movements at places spaced from the center of the disk as the disk is rotated,

means for drivingly rotating said disk about its center,

a carriage movable transversely with respect to said disk,

a pair of transducers positioned at opposite faces of said disk and each having a disk engaging face, and

means mounting said transducers with respect to said carriage and including a universal joint connection for each of said transducers and including a spring means connecting each of said universal joint connections with said carriage and urging said transducers toward contacting positions with said disk,

each of said universal joint connections including a rounded

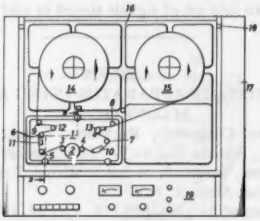
part in contact with a companion part on which the rounded part may pivot, said rounded parts each being geometrically centered with respect to the disk engaging face of the respective transducer and being located directly opposite each other on an axis normal to the plane of said magnetic disk with said transducers being in contact with said disk on opposite sides thereof so that said transducers may pivot about their said universal joint connections to have corresponding but opposite pitching and rolling movements as said disk wobbles during its rotation.

4,089,030

HELICAL SCAN VTR TAPE DECK WITH RESILIENTLY MOUNTED SCANNING ASSEMBLY

Heinrich Zahn, Claudiusweg 4, 6101 Rossdorf, Germany

Filed May 19, 1976, Ser. No. 687,907
Claims priority, application Germany, May 20, 1975, 2522270
Int. Cl.[2] G11B *15/00, 21/00*
U.S. Cl. 360—137 **7 Claims**



1. In a tape deck having tape scanning, tape guidance, and tape transport means, for recording onto or retrieving information from, a magnetic tape; and storage/delivery spools with associated driving motors for delivering the tape to the scanning, guidance and transport means, and for storing the tape; the improvement comprising:

a first base plate supporting the tape scanning, tape guidance and tape transport means thereon;

a second base plate separate from said first base plate supporting the storage/delivery spools and associated driving motors therein; and

mounting means interconnecting said base plates and including yieldably resilient means, whereby torsional deforming forces of said second base plate are restrained from being transmitted to said first base plate.

4,089,031

SAFETY PROTECTION CIRCUIT

Troy Franklin Stevens, 407 Parma, Lake Villa, Ill. 60046

Filed Mar. 24, 1977, Ser. No. 780,602
Int. Cl.[2] H02H *3/04*
U.S. Cl. 361—50 **18 Claims**

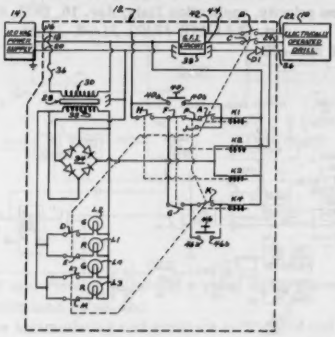
1. A safety protection circuit for controlling the operation of electrically-operated power tools comprising:

switching means for closing and opening contact means which connect a power source to an electrically-operated power tool for penetrating electrically non-conductive material;

first relay means having a contact operatively connected to said switching means, said switching means being responsive to said first relay means for opening said contact means when the housing of the power tool is grounded upon contacting an electrically conductive material thereby disconnecting the power source to the power tool and stopping operation of the power tool;

second relay means having a contact operatively connected to said switching means;

actuating means for manually actuating said second relay means, said switching means being responsive to said second relay means upon actuation of said actuating means for subsequently closing said contact means when the housing of the power tool is grounded thereby reconnecting the power source to the power tool to resume operation of the power tool for penetrating the electrically conductive material; and



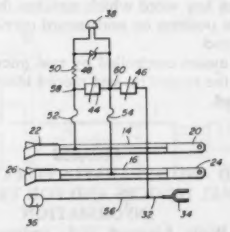
said first relay means being operatively connected to said second relay means, said second relay means being responsive to said first relay means by causing the switching means to open again said contact means after breaking contact with the electrically conductive material thereby disconnecting again the power source from the power tool and stopping operation of the power tool.

4,089,032

PLUG-TYPE TRANSIENT SURGE SUPPRESSOR

William Dell Orfano, 6 Villa St., Chelsea, Mass. 02150

Filed Sep. 8, 1976, Ser. No. 721,196
Int. Cl.[2] H02H *9/04*
U.S. Cl. 361—56 **9 Claims**



1. A transient surge suppressor comprising:

(a) transient surge suppressor circuitry means;

(b) a potted body containing at least portions of said transient surge suppressor circuitry;

(c) a pair of male contact means connected to said transient surge supperssor and fixed to said potted body;

(d) a pair of female contact means connected to said transient surge suppressor and fixed to said potted body, one of each said female contact means connected to one of each said male contact means;

(e) ground means connected to said transient surge suppressor circuitry;

(f) a casing molded about said potted body, said male contact means extending from said casing, said female contact means and said ground means accessible at a face of said casing;

(g) said transient surge suppressor circuitry including a pair of non-linear resistive elements having symmetrical conductive properties, a pair of fuse elements and indicator

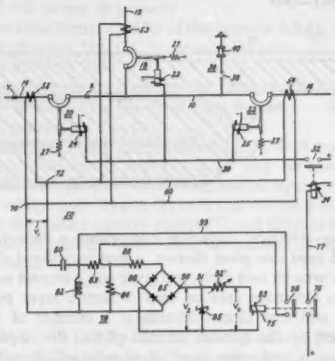
means, one of said fuse elements connected between one of said male contact means and one side of one of said resistive elements, the other of said fuse elements connected between the other of said male contact means and the other side of said one resistive element, one side of the other resistive element connected to the other side of said one resistive element, the other side of said other resistive element connected to said ground means, said indicator means connected across said one resistive element.

4,089,033

HIGH SPEED BUS DIFFERENTIAL RELAY

Sandor Mentler, Downingtown, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Mar. 4, 1977, Ser. No. 774,551
Int. Cl.[2] H02H 3/28
U.S. Cl. 361—110 5 Claims



1. In a high-speed differential protective arrangement for protecting a power circuit from faults internal to a predetermined zone of the power circuit, said power circuit having connected thereto in said zone a lightning arrestor which is adapted to spark over in response to an overvoltage and to thereafter allow follow-through current to flow therethrough typically for times equal to or less than a predetermined maximum period,

(a) means for developing a first voltage varying directly with the vector sum of the currents flowing into and out of said zone,

(b) a filter energized by said first voltage and developing a second voltage generally free from any aperiodic component of said first voltage,

(c) rectifying means energized by said second voltage and having output terminals across which a unidirectional third voltage varying directly in magnitude with said second voltage is developed,

(d) a relay having an operating element connected across the output terminals of said rectifying means for energization by said third voltage,

(e) a zener diode connected across the output terminals of said rectifying means in parallel with said relay operating element,

(f) said relay being operable when the voltage V_0 developed by said third voltage across said operating element is equal to or greater than a predetermined minimum pick-up level $V_{p.u.}$ but remaining inactive at lower values of V_0,

(g) said zener diode having a zener voltage slightly higher than a value of voltage applied thereto that results in a voltage V_0 equal to said predetermined minimum pick-up level being applied to said operating element,

(h) said zener voltage being sufficiently low that during lightning arrestor follow-through current the voltage developed across said zener diode substantially equals said zener voltage, and

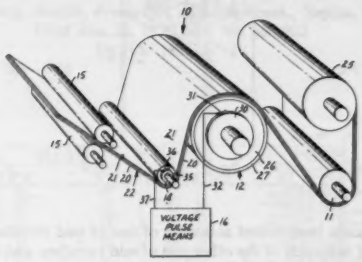
(i) said relay having a sufficiently long pick-up time to prevent relay operation in response to lightning arrestor operations that result in follow-through currents persisting for times equal to said predetermined maximum period.

4,089,034

MACHINE AND METHOD FOR POLING FILMS OF PYROELECTRIC AND PIEZOELECTRIC MATERIAL

Allen L. Taylor, Woodbury, and William F. Sheffield, Oakdale, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 30, 1976, Ser. No. 681,891
Int. Cl.[2] H05F 1/02, 3/02
U.S. Cl. 361—233 36 Claims



1. A poling apparatus for continuously processing a length of film of polymeric material to provide at least one of pyroelectric and piezoelectric properties in the film, comprising:

a first means at a poling station for applying an electric potential to at least a portion of one broad surface of the film;

a second means located at the poling station for coacting with said first means to establish an electric field across said portion of the film to provide moderate coefficients of at least one of said pyroelectric and piezoelectric properties in said portion;

a drive means for continuously advancing the film past the poling station; and

a third means electrically connected to said first and second means for providing electric potentials to said first and second means to establish a plurality of time-spaced electric field pulses across said portion of the film while it is advancing past the poling station, the width of each said pulse being less than the time said portion of the film is under the influence of the electrical field established by said first and second means.

4,089,035

HAND-HELD DETONATOR

Don H. Smith, Dallas, Tex., assignor to Tyler Holding Company, Lewisville, Tex.

Filed Feb. 4, 1976, Ser. No. 655,148
Int. Cl.[2] F23Q 7/02
U.S. Cl. 361—251 8 Claims

1. A hand-held blasting device comprising:

a rigid housing having top, bottom and side walls dimensioned to be held in the hands of an operator during operation,

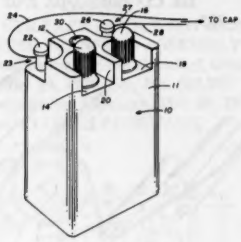
a first pair of spaced apart depressions formed in said top wall of said housing, each of said first pair of depressions including base portions and side wall portions extending from said base portions to said top wall of said housing,

binding posts mounted in said base portions of said first depressions and extending parallel to said side walls of said first depressions for attachment to an explosive charge, said binding posts being protected by said first depression from inadvertent contact with the fingers of the operator,

a second pair of spaced apart depressions formed in said top wall of said housing and being disposed between said first pair of depressions,

first and second switches mounted in said second pair of depressions on said top wall of said housing for actuation by the fingers of the operator,

each of said second pair of depressions including base portions and side wall portions extending from said base portions to said top wall of said housing and forming a wall partition between said first and second switches, said second pair of depressions dimensioned for receiving the fingers of the operator and said wall partition protecting



against inadvertent actuation of one of said switches during actuation of the other one of said switches, and against contacting said binding posts and to encourage the use of fingers on opposite hands for actuating said switches,

a battery mounted within said housing,

a capacitor mounted in said housing, and

circuitry operable in response to operation of said first switch for connecting said capacitor to said battery for charging said capacitor from said battery and said circuitry further operable in response to operation of said second switch for connecting the charged capacitor across said binding posts to detonate an explosive charge.

4,089,036

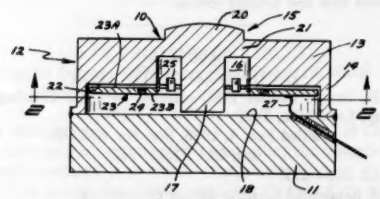
CAPACITIVE LOAD CELL

Robert L. Geronime, Rosemount, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Continuation of Ser. No. 457,698, Apr. 4, 1974, abandoned. This application Nov. 10, 1976, Ser. No. 740,487

Int. Cl.² H01G *7/00, 5/16*

U.S. Cl. 361—283 **11 Claims**



1. A sensor for receiving forces to be measured comprising a support, a force responsive deflectable diaphragm member having a main portion and a central portion, said main portion surrounding said central portion, means mounting the main portion of said diaphragm member to said support at location spaced radially outwardly from the central portion to permit deflection of said diaphragm member under force, said diaphragm member having a recess formed in the central portion, said recess being spaced from the means mounting the main portion of said diaphragm member to said support by said main portion, and said recess forming a wall section at the central portion substantially thinner than the main portion of said diaphragm member, and capacitive sensing means to sense deflection of said diaphragm member from a rest position comprising a capacitor plate member mounted directly to said diaphragm member for translatory movement therewith, said capacitor plate member being mounted to the main portion at a preselected position adjacent the recess and having a surface portion thereof facing a surface portion of the main portion of said diaphragm member, said surface portions changing in spacing with respect to said diaphragm member during deflection of said diaphragm member.

4,089,037

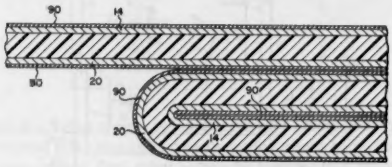
PLEATED METALLIZED FILM CAPACITORS

Charles C. Rayburn, Mt. Prospect, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Jul. 25, 1977, Ser. No. 818,628

Int. Cl.² H01G *1/01*

U.S. Cl. 361—305 **6 Claims**



1. In an electrical capacitor comprising a dielectric layer having at least one pleat therein, a first metallized aluminum electrode area on said dielectric layer and a second metallized aluminum electrode area on said dielectric layer positioned adjacent said first electrode area at a number of locations determined by the number of said pleats, the improvement comprising a protective layer over substantially all of said aluminum layer of said first and second electrode areas which is formed of a metal which is oxidized in air to a much smaller degree than is aluminum.

4,089,038

DIELECTRIC COMPOSITIONS OF ZIRCONATES AND/OR ALUMINATES AND DEVICES THEREOF

Rudolph John Bacher, New Castle, Del., assignor to E. I. Du Pont de Nemours and Co., Wilmington, Del.

Filed Mar. 30, 1976, Ser. No. 672,032

Int. Cl.² C04B *35/00;* H01G *4/20*

U.S. Cl. 361—320 **14 Claims**

1. Compositions of finely divided inorganic powders useful for forming dielectric layers in multilayer electronic structures of conductive and dielectric layers on an alumina substrate; those dielectric layers being capable of producing such multilayer structures having a dielectric constant below 10 and a dissipation factor of 0.8% or less, each at 1 kHz., and a quality factor of about 400 or greater at 1 MHz., the compositions consisting essentially of, by weight,

a. 67.5–85% of one or more non-conducting glasses having a softening point greater than 700° C. and a thermal expansion coefficient less than that of alumina, and the balance is

b. 15–32.5% of one or more of

1. crystalline ternary oxides of the formula AB_2O_4 wherein A is divalent Mg, Ca, Sr and/or Ba and B is trivalent Al,

2. crystalline ternary oxides of the formula ABO_3 wherein A is divalent Mg, Ca, Sr and/or Ba and B is tetravalent Zr,

3. mixtures of precursor crystalline oxides capable of forming crystalline ternary oxides (1) and (2),

provided that where the sum of the weights of crystalline ternary oxides (1) and (2) in these compositions is less than 15%, the relative proportions of precursor crystal-

line oxides (3) are such that in the fired dielectric layers(s) in the aforesaid multilayer electronic structure(s) there will be a total of at least 15% of crystalline ternary oxides (1) and (2).

12. In multilayer electronic structures comprising as sequential layers on a prefired alumina substrate a bottom electrode on and adherent to said substrate, a dielectric layer over and adherent to at least part of said bottom electrode, and a top electrode over and adherent to at least part of said dielectric layer, improved multilayer structures capable of having a dielectric constant below 10 and a dissipation factor of 0.8% or less, each at 1 kHz., and a quality factor of about 400 or greater at 1 MHz., wherein said dielectric layer(s) consist essentially of by weight,

a. 67.5–85% non-conducting glass having a softening point greater than 700° C. and a thermal expansion coefficient less than that of alumina, and the balance is

b. 15–32.5% of one or more of

1. crystalline ternary oxides of the formula AB_2O_4 wherein A is divalent Mg, Ca, Sr, and/or Ba and B is trivalent Al,

2. crystalline ternary oxides of the formula ABO_3 wherein A is divalent Mg, Ca, Sr, and/or Ba and B is tetravalent Zr,

provided that where there is less than 32.5% of crystalline ternary oxides (1) and (2) there may be present an amount of precursor crystalline oxides capable of forming compounds (1) and (2) such that the total weight of said crystalline ternary oxides (1) and (2) plus the precursor crystalline oxides does not exceed 32.5% of the aforesaid compositions.

4,089,039

THIN FILM TANTALUM OXIDE CAPACITOR

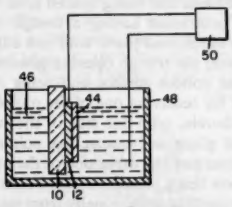
Peter L. Young, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 656,525, Feb. 9, 1976, Pat. No. 4,002,542. This application Aug. 23, 1976, Ser. No. 716,884

The portion of the term of this patent subsequent to Jan. 11, 1994, has been disclaimed.

Int. Cl.² H01G 1/10

U.S. Cl. 361—322 **3 Claims**



1. A thin film capacitor comprising

a dielectric substrate,

a first non-tantalum electrically conductive film electrode disposed on said substrate,

a second electrically conductive film electrode, and

a dielectric film consisting essentially of tantalum oxide disposed intermediate said first and second electrodes and being in contact with both said first and second electrodes,

said dielectric film being characterized in that it is formed by the steps of

providing the combination of said dielectric substrate having said nontantalum electrically conductive film thereon

disposing said substrate and conductive film within a vacuum environment,

applying a continuous film of tantalum oxide of desired thickness over said conductive film within said vacuum environment,

removing the composite so formed from said vacuum environment,

providing a liquid anodizing bath, thereafter

disposing said composite in said liquid anodizing bath,

passing an electrical current through said tantalum oxide film, said current being substantially constant until a predetermined desired voltage is reached, and

removing said composite from said anodizing bath,

whereby said capacitor exhibits a loss tangent less than 0.005, a breakdown voltage of at least 75 volts and a leakage current less than 10^{-9} amp at 75 volts.

4,089,040

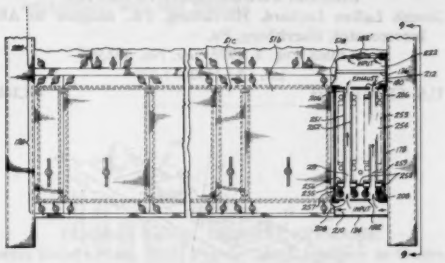
ELECTRICAL/ELECTRONIC RACK AND PLUG-IN MODULES THEREFOR

Donald E. Paulsen, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash. and Aeritalia S.p.A., Naples, Italy

Filed Jan. 28, 1976, Ser. No. 653,023

Int. Cl.² H05K 7/20

U.S. Cl. 361—383 **3 Claims**



1. In combination, a rack having first and second compartments therein and a plurality of modules removably disposed in side-by-side relation in first and second horizontal rows in said first and second compartments, respectively, and supported by said rack, said rack comprising a framework of rigid members and first, second and third vertically spaced-apart, horizontal wall panels, said first and second wall panels being disposed and supported by said framework so as to define the bottom and top, respectively, of said first compartment, and said third wall panel being disposed and supported by said framework so that said second and third wall panels define the bottom and top, respectively, of said second compartment;

each of said modules including a substantially enclosed housing containing electrical or electronic components, each said housing being comprised of first and second, vertically spaced-apart, apertured panels forming the bottom and top, respectively, of said housing;

the first apertured panels of the housings of said first row of modules being arranged in a common horizontal plane that is spaced apart from said first wall panel so as to define together with said framework a first plenum chamber for receiving cooling air under pressure so that the cooling air passes into the housings of said first row of modules through apertures in said first apertured panels of such housings, and said second apertured panels of the housings of said first row of modules being arranged in a common horizontal plane that is spaced apart from said second wall panel so as to define therebetween a second plenum chamber having an upper boundary formed by said second wall panel and a lower boundary substantially formed by said second apertured panels of the housings of said first row of modules for receiving air that is exhausted through apertures in said second apertured panels of said housings in said first row of modules;

the first apertured panels of the housings of said second row of modules being arranged in a common horizontal plane spaced apart from said second wall panel so as to define therebetween a third plenum chamber having a lower boundary formed by said second wall panel and an upper boundary substantially formed by said first apertured

panels of the housings of said second row of modules for receiving cooling air under pressure so that the cooling air passes into the housings of said second row of modules through apertures in the first apertured panels of such housings, and said second apertured panels of the housings of said second row of modules being arranged in a common horizontal plane that is spaced apart from said third wall panel so as to define with said framework a fourth plenum chamber for receiving air that is exhausted through apertures in said second apertured panels of said housings in said second row of modules;

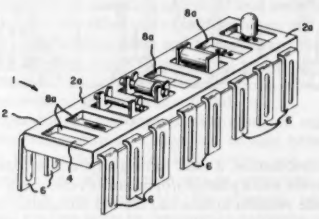
first conduit means for receiving cooling air under pressure and for conducting such cooling air to said first and third plenum chambers, and second conduit means for conducting exhaust air from said second and fourth plenum chambers to a point remote from said rack.

4,089,041

CIRCUIT PROGRAMMING DEVICE

Joseph LaRue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 7, 1975, Ser. No. 602,952
Int. Cl.² H05K *1/04*
U.S. Cl. 361—403 **4 Claims**



1. A method for providing a program of interruptable jumper connections across a plurality of spaced circuit paths on the flat surface of a circuit board, comprising the steps of:

embedding a plurality of normally electrically continuous conductors in a dielectric base,

each of said conductors being provided with a pair of integral lead portions projecting from opposite sides of said base,

bending said lead portion proximate said sides of said base to provide vertically depending electrical leads,

exposing portions of said conductors in corresponding recesses provided in said base,

dividing one or more selected exposed portions into respective spaced conductor portions subsequent to embedding said conductors in said base thereby electrically interrupting each said selected normally continuous conductor and thereby providing a selective program of conductors comprising only divided conductors on said base or a combination of divided and continuous conductors on said base,

mounting said dielectric base onto said flat surface of said circuit board,

electrically connecting corresponding electrical leads of said conductors to selected spaced circuit paths whereby each said continuous conductor of said selective program provides an electrically conductive jumper connection across corresponding selective spaced circuit paths and whereby each said divided conductor of said selective program is electrically interrupted to prevent a jumper connection across corresponding selected spaced circuit paths,

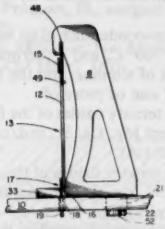
bending free end portions of said spaced conductor portions of at least one said divided conductor to project vertically upward from said base to provide spaced tab type electrical terminals defining therebetween an electrical component receiving space in vertical alignment with a corresponding recess.

4,089,042

SUPPORT FOR HYBRID SUBSTRATE CARRYING ELECTRICAL CIRCUIT PATTERNS AND ELEMENTS

Roy B. Torburn, Palo Alto, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Nov. 22, 1976, Ser. No. 744,206
Int. Cl.² H05K *1/04*
U.S. Cl. 361—412 **5 Claims**



1. Apparatus for supporting a hybrid substrate (carrying electrical circuit patterns and elements and having a pair of opposing edges) in a given position that is generally orthogonal to a first plane containing a flat member so as to restrict rotational movement of the substrate in a second plane parallel to it and in a third plane orthogonal to the first and second planes after mating connector pin and socket parts associated with the substrate and flat member are engaged, the flat member having a hole in the top side thereof that is spaced from the associated connector socket part, comprising:

a body section having a flat bottom surface for contacting the one side of the flat member and having one side that is adjacent to said bottom surface with at least two spaced-apart sections each having points in the second plane that is generally orthogonal with respect to a fourth plane including said bottom surface;

a protrusion projecting from said side of said body beyond the second plane and being spaced from said bottom surface, said protrusion having a trough therein which is parallel to the second plane with one edge thereof in the second plane, the trough opening generally in the direction of said bottom surface and being dimensioned and positioned for receiving one of the opposing edges of the substrate therein, with one side of the substrate being in the second plane and contacting points of said spaced apart sections and the other one of the opposing edges of the substrate being proximate said bottom surface;

a first peg projecting orthogonally from said bottom surface and having a cross-section that is similar to that of the hole in the flat member and that is dimensioned to provide a slip fit in this hole; and

a second peg projecting from said side of said body and beyond the second plane with at least a line in the base of said second peg being in the fourth plane including the bottom surface of said body;

the one and other substrate edges being located in the trough and adjacent the junction of the second peg with the one body side, respectively, and the pin and socket structures being engaged with said first peg located in the hole in the flat member and said bottom surface contacting the one side of the flat member for supporting the substrate orthogonal to the one side of the flat member, said body and first peg each having a thickness causing said first peg to bind in the hole when the body is rotated in the second plane, a point in the free-end of said second peg also being located in the fourth plane and contacting the one side of the flat member for cooperating with said first peg in the

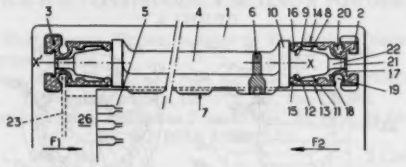
hole for increasing the rotational force required for rotating said body in one direction in the third plane.

4,089,043

FRAME FOR PRINTED CIRCUIT CARDS

Gilbert Fraboni, Brignoud, and Jean Neyroud, St-Martin-d'Heres, both of France, assignors to La Telemecanique Electrique, France

Filed Oct. 5, 1976, Ser. No. 729,916
Int. Cl.² H02B *1/02*
U.S. Cl. 361—415 **2 Claims**



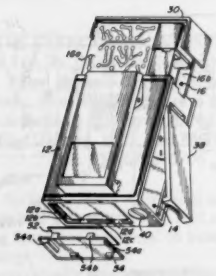
1. A frame assembly for printed circuit boards comprising: two lateral walls; two pairs of parallel longitudinally extending metallic cross-members mounted between said lateral walls at right angles therewith and a plurality of transverse guide members supported by said cross-members, each of said cross-members having two substantially parallel resilient arms each provided at one end with a longitudinally extending bead, the beads of the said two arms facing one another and a common wall joining the said two arms at the opposite ends thereof and, provided with a plurality of regularly distributed openings, each of said guide members having at least at one end thereof, an extension adapted to enter one of said openings, and two inclined surface portions, at least one of said surface portions being provided with a longitudinally extending groove arranged for engaging on one of said beads, when the extension enters said opening.

4,089,044

HOUSING ASSEMBLY FOR MINIATURIZED BATTERY OPERATED ELECTRICAL APPARATUS

Donald Frederick Gatto, Sunrise; Juan Milciunas, Ft. Lauderdale; William Karl Strobel, Lauderdale Lakes; Leo Vincent Krolak, Plantation, all of Fla., and Pete Varasse, Wichita, Kans., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 15, 1977, Ser. No. 777,735
Int. Cl.² H05K *1/04*
U.S. Cl. 361—422 **7 Claims**



1. An improved, weather-resistant housing assembly especially suited for battery operated miniaturized electrical apparatus comprising a chassis with operating control switch, self-contained battery compartment and transducer for reproducing audible signals, said housing assembly including in combination:

a one-piece housing with bottom, front, back and side walls molded of a plastic material and open at the top for receiving the associated electrical apparatus chassis therein, said housing having slots in said bottom and a pivotable cover at one side overlying the self-contained battery compartment;

a control panel for interfitting with said chassis and covering said housing top, said control panel including a plurality of apertures forming an acoustical grille, a slideable actuator bar to engage and interfit with the chassis operating control switch;

means for weather sealing and shock mounting the apparatus chassis within said housing;

hidden latch means for interlocking said chassis in assembled relation with said housing; and

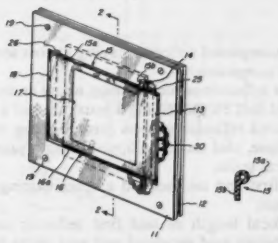
a retaining cover plate having a plurality of hook members for extending into and retained within said slots in said housing bottom to thereby disguise and render inaccessible said latch means, said cover plate being formed of a plastic material whereby said hook members readily break when said cover plate is attempted to be removed from engagement with said housing.

4,089,045

PLASMA PANEL MOUNTING FRAME

James Robert Mars, Eden Prairie, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Nov. 8, 1976, Ser. No. 739,401
Int. Cl.² F21V *15/04*
U.S. Cl. 362—390 **12 Claims**



1. Apparatus for supporting a plasma display panel of the type formed of first and second flat approximately rectangular plates each longer than the other is wide and firmly attached to each other face to face with each end of each extending past a lateral edge of the other, and comprising:

(a) first through fourth resilient gasket strips each having a thickened edge portion and a less thick retaining tab portion, each of said gaskets' retaining tab portions lying transverse to and touching the face of a panel plate end extending past a lateral edge of the other panel plate, with said gasket's thickened edge extending along and touching a lateral edge of said other panel plate;

(b) first and second mounting frames, each having a pair of interior edges lying adjacent to and extending along a gasket, each edge extending at least to the lateral edges of the panel plate adjacent the adjacent gasket's retaining tab and each said edge so spaced from the other edge in its frame as to cause each edge to compress its adjacent gasket's thickened edge portion; and

(c) means for supporting each frame so as to trap the gaskets' retaining tabs between the frames and panel plates.

4,089,046
MUSIC STAND LAMP

William P. Cannon, c/o Cannon Products, Inc., Box 422, Elwood, Ind. 46036

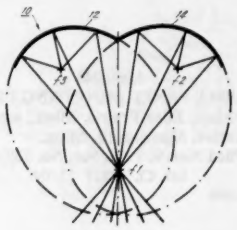
Filed May 16, 1977, Ser. No. 797,195
Int. Cl.² F21V 33/00
U.S. Cl. 362—99 13 Claims

1. A lamp for mounting on a music stand, comprising a front upright; a horizontally extending base mounted on the lower end of said front upright; a lamp assembly mounted at the upper end of said front upright; a rear upright; and means connected between said front and rear uprights near their upper ends for variably spacing said uprights from each other, said rear upright extending downwardly from said connecting means so that said front and rear uprights form a downwardly open slot for receiving a music stand.

4,089,047
TRIFOCAL MIRROR-REFLECTOR

Willy Luderitz, Westerbachstrasser 27, Lubbecke, Germany (4990)

Filed Sep. 23, 1976, Ser. No. 725,970
Claims priority, application Germany, Apr. 26, 1976, 2618188; Apr. 26, 1976, 2618187
Int. Cl.² F21V 7/00; F24J 3/02
U.S. Cl. 362—297 18 Claims



1. A compound reflector having a cross section, which cross section comprises:

a first reflector section formed along an arc of a first ellipse, said first ellipse having a proximal and a distal focal point;

a second reflector section formed along an arc of a second ellipse, said second ellipse having a proximal and a distal focal point;

said first and said second ellipses sharing a common focal point;

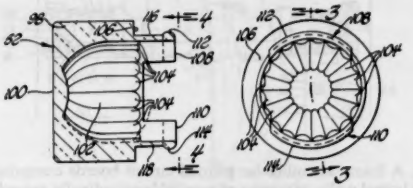
the focal length of said first reflector section, as defined between said proximal and said distal focal point of said first reflector section, and the focal length of said second reflector section, as defined between the proximal and distal focal points of said second reflector section, being unequal.

4,089,048
LENS STRUCTURE

Dale L. Bull, and Norman A. Rautiola, both of Reed City, Mich., assignors to Nartron Corporation, Reed City, Mich.

Division of Ser. No. 544,773, Jan. 28, 1975, Pat. No. 3,982,122. This application Jul. 6, 1976, Ser. No. 702,893
Int. Cl.² F21V 5/04
U.S. Cl. 362—338 11 Claims

1. A lens for detachable connection to associated support structure, comprising a lens main body portion at least a major portion of which is comprised of at least translucent material, said main body portion comprising a generally relatively forwardly disposed first end and a generally relatively rearwardly disposed second end, a recess-like cavity formed in said main body portion, said cavity having an end opening in said second end, said second end comprising generally laterally extending first mounting abutment surface means, and at least first and second leg-like members integrally formed with said main body portion and extending from said second end in a direction generally normal to said first mounting abutment surface means, said leg-like members being resiliently deflectable with respect to said main body portion and spaced from each other, said first and second leg-like members respectively having first and second free ends resiliently deflectable generally towards and away from each other, said first free end having a first portion formed thereon of relatively enlarged cross-sectional thickness, said second free end having a second portion thereon of relatively enlarged cross-sectional thickness, said first and second enlarged portions being effective to engage

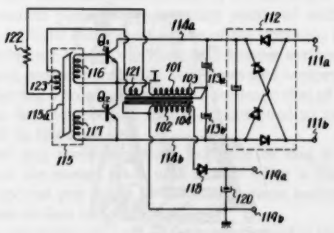


first surface means of said associated support structure in order to thereby detachably hold said first mounting abutment surface means operatively engaged against juxtaposed second surface means of said associated support structure, said cavity comprising cavity-defining surface means situated generally internally of said main body portion, said cavity-defining surface means being of a generally cylindrical configuration when viewed in a plane generally parallel to said first mounting abutment surface means, and said cavity-defining surface means comprising a plurality of generally convoluted surface segments extending generally from said second end and toward said first end.

4,089,049
INVERTER CIRCUIT INCLUDING TRANSFORMER WITH SHIELDING OF UNDESIRED RADIATIONS

Tadao Suzuki; Tadao Yoshida, and Shigeaki Wachi, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jun. 7, 1976, Ser. No. 693,522
Claims priority, application Japan, Jun. 11, 1975, 50-70650; Aug. 22, 1975, 50-101794
Int. Cl.² H02M 3/335
U.S. Cl. 363—17 1 Claim



1. A transformer comprising:

(a) a primary winding having a pair of terminals;

(b) a secondary winding having a pair of terminals;

(c) a magnetic core provided in connection with said primary and secondary windings magnetically and connected to one terminal of said secondary winding electrically;

(d) a first static shield body provided at the side of said primary winding and between said primary and secondary windings;

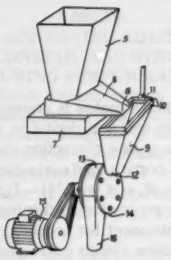
(e) a second static shield body provided at the side of said secondary winding and between said primary and secondary windings;
(f) a third static shield body provided between said magnetic core and said primary winding;
(g) means for connecting said first and third static shield bodies to one terminal of said pair of terminals of said primary winding, respectively; and
(h) means for connecting said second static shield body to one of the pair of terminals of said secondary winding.

4,089,050

DEVICE FOR CONTINUOUSLY MIXING A POWDER IN A LIQUID

Joël Huet, Vernon, France, assignor to The Societe Dilumelt, Vernon, France

Division of Ser. No. 523,153, Nov. 12, 1974, Pat. No. 4,002,324. This application Sep. 16, 1976, Ser. No. 723,701
Claims priority, application France, Mar. 20, 1974, 74 09512
Int. Cl.[2] B01F *7/04, 15/02*
U.S. Cl. 366—181 **2 Claims**



1. A device for the dispersion of a powder in a liquid and particularly a powder having a considerable solvation capacity with respect to a liquid in which said powder is intended to be dispersed, comprising a unit for supplying powder, a unit for supplying liquid and forming the liquid into a flow passage for the powder, thereby enveloping the powder received in the passage from the powder supply unit, and an atomization unit for receiving the powder and enveloping liquid, wherein the atomization unit is a blade-type impeller having an axis of rotation which is inclined to the horizontal at an angle within the range of 0° to 20°, the liquid flow passage being admitted at the center of said impeller and the dispersion obtained being discharged from said impeller under the action of gravity.

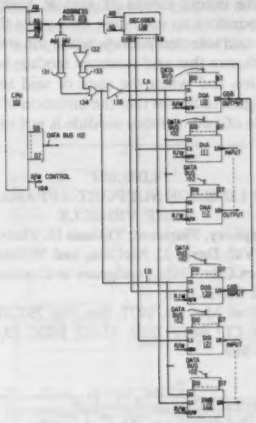
4,089,051

ALTERNATIVE DIRECT AND INDIRECT ADDRESSING

James Patrick Lee, Jr., Matawan; Joseph Anthony Raffa, Union; Frank Peter Sansone, Freehold, and Nathan Harold Stochel, Edison, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 24, 1977, Ser. No. 761,525
Int. Cl.[2] G06F *3/06*
U.S. Cl. 364—200 **4 Claims**

1. A system for individually addressing more than one identical sets of units and the units within said sets, said units being for performing functions peripheral to a central processor, said system including:
means for individually selecting any one of said sets of units responsive to a first part of a multibit code on an address bus of said central processor;
means for decoding a second part of said code on said address bus to designate any one of said units contained within all of said sets;
means for storing within a unit of each set a code for selectably addressing only one of said sets at a given time; and
means responsive to said first part of said address code for choosing between set selection by either said selecting means or said storing means, wherein said central processor is required to store only one group of said decoding



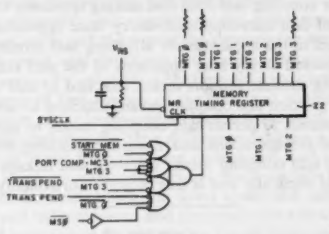
means second part input addresses for addressing all of said units.

4,089,052

DATA PROCESSING SYSTEM

Ronald Hans Gruner, Cary, N.C., assignor to Data General Corporation, Southboro, Mass.

Division of Ser. No. 749,911, Dec. 13, 1976, Pat. No. 4,048,623, which is a continuation of Ser. No. 509,159, Sep. 25, 1974, abandoned. This application Jun. 6, 1977, Ser. No. 803,639
Int. Cl.[2] G06F *13/00*
U.S. Cl. 364—200 **2 Claims**



1. In a data processing system, which includes a memory system comprising at leat one memory module for use with at least one data accessing control unit, each said at least one memory module having timing means for generating timing signals to control the operating time cycly thereof, said at least one data accessing control unit including means for providing a first memory control signal for requesting the initiation of an operating time cycle of said at least one memory module and means for providing a second memory control signal for preventing the initiation of an operating time cycle of said at least one memory module which has been so requested, said data accessing control unit further including means for providing an address signal, said at least one memory module comprising
means responsive to said first memory control signal and to an address signal from a data accessing control unit for producing a memory address select signal when an address in said memory module has been selected for access by said data accessing control unit;
means for generating a busy signal when said memory module is currently in an operating state;
means connected to said memory module timing means and responsive to said address select signal, and to the states of

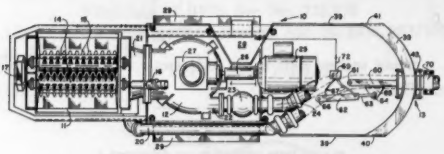
said busy signal and said second memory control signal at each memory operating time cycle for starting the operation of the timing means of said at least one memory module to initiate an operating time cycle thereof in order to access said selected address when the state of said busy signal indicates that said memory module is currently not in operation and when the state of said second memory control signal indicates that the initiation of said operating time cycle of said memory module is not to be prevented.

4,089,053

HOSE AND LINKAGE SUPPORT APPARATUS FOR A SUMP VEHICLE

Ronald W. Umphrey, Fairmont; Thomas H. Plate, Morgantown, both of W. Va.; David L. McCain, and William T. Sweeney, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed May 16, 1977, Ser. No. 797,272
Int. Cl.[2] B01F *7/02, 15/02;* B02C *23/36*
U.S. Cl. 366—349 **9 Claims**



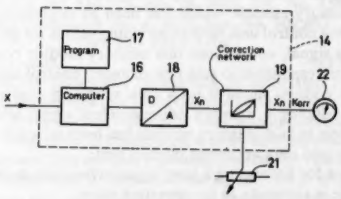
1. A transport vehicle for movement along the surface of the earth having a forward portion with apparatus mounted thereon for mixing dry coal with fluid to form a slurry, and a rear portion for attaching the terminus of a cart-supported slurry hose apparatus wherein said cart-supported slurry hose apparatus has linkages interconnecting said carts with the terminus of said linkage attached to said rear portion and means for coupling said fluid coal mixing apparatus to the hose portion of said cart-supported slurry hose apparatus, an improvement in the apparatus for attaching said terminus of the cart-supported slurry hose apparatus to the said rear portion comprising arcuate support means attached to said vehicle at said rear portion and coupling means attached to said arcuate support means to permit said coupling means to move freely along said arcuate means, and means for attaching said linkage means to said coupling means whereby said linkage means is supported vertically and is free to pivot horizontally.

4,089,054

DEVICE FOR MEASURING THE THICKNESS OF LAYERS WITH A RADIONUCLIDE IRRADIATING THE LAYER

Albert Ott, Sindelfinger Strasse 118, 7032 Sindelfingen 6, Germany

Filed May 28, 1976, Ser. No. 691,039
Claims priority, application Germany, Mar. 18, 1976, 2611411
Int. Cl.[2] G06F *15/20;* G01N *23/20*
U.S. Cl. 364—527 **5 Claims**



1. A device for measuring the thickness of layers of solid materials, such as of thin metal layers on a carrier layer of another metal, by the Beta ray backscatter method, comprising

a radionuclide irradiating the layer, which radionuclide produces radiation whose energy corresponds to the thickness of the layer, each radionucilide/layer material and if present, carrier material- combination defining a special test problem.

a detector which receives the backscatter radiation, which comes from the layer and a possibly present carrier material and produces at its output a pulse count, X, in the region between a lower first count X_0 corresponding to the backscatter associated with zero layer thickness, and an upper count X_s associated with the range of an infinitely thick layer, and

a digital computing means connected to said detector, said digital computing means comprising means for dividing the difference between the detected pulse count, X, and the lower first count, X_0, by the difference between the upper pulse count, X_s and the lower first pulse count X_0, to calculate from the output pulse count from the detector a normalized pulse count

$$X_n = \frac{X - X_O}{X_s - X_O}$$

wherein:

said digital computing means is connected to a digital to analog converter and said digital to analog converter is connected to an analog correction circuit, having a permanently wired portion, said correction circuit realizing a function $X_{n\,corr} = X_n + A\,[a_2 X_n^p (1 - X_n)^q]$ and generating an output signal in proportion to this function, and wherein an indicator instrument for receiving said analog signal from the correction circuit corresponding to $X_{n\,corr}$ and having an interchangeable, non-linear scale calibrated in thickness with respect to the special test problem, and

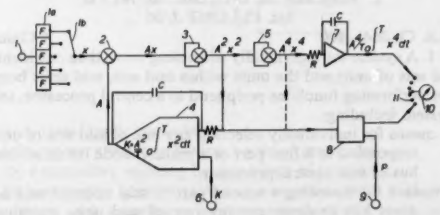
means for externally setting the magnitude A of the correction function are provided, where A is a dimensionless number between + 1 and −1, a_2 is a dimensionless number between + 0.1 and −0.1, p and q are dimensionless positive values substantially between 0.5 and 1.5 but different from one another, and which are realized by said permanently wired porition of the correction circuit.

4,089,055

ELECTRONIC MONITORING APPARATUS

David Dyer, and Trevor H. Wilmshurst, both of Southampton, England, assignors to British Steel Corporation, London, England

Filed Mar. 9, 1976, Ser. No. 665,248
Claims priority, application United Kingdom, Mar. 14, 1975, 10767/75
Int. Cl.[2] G01H *1/00;* G06G *7/26*
U.S. Cl. 364—551 **7 Claims**



5. Apparatus for automatically computing the kurtosis coefficient of analog signals comprising:

means for producing electrical signals proportional to the analog signals,

means for filtering the electrical signals into a plurality of at least two frequency bands,

means for normalizing the filtered signals with respect to their root mean square values,

means for squaring the normalized signals,

means for squaring the normalized squared signals, and

means for integrating with respect to time the squared normalized squared signals to give output signals prportional to the kurtosis values of the original analog signals.

6. Apparatus for electronically monitoring the condition of an object which normally emits stationary stochastic signals comprising:

means for providing electrical signals in a plurality of at least two frequency bands representative of the emitted signals, means for determining over a period of time kurtosis coefficients for these signals and means for detecting variations in these kurtosis coefficients to provide an indication of the condition of the object wherein the electrical signals are representative of vibrations occurring during operation of machinery.

4,089,056

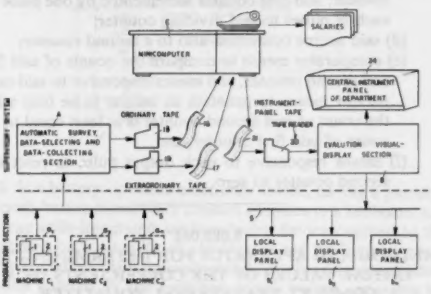
METHOD AND AUTOMATED EQUIPMENT FOR THE TRACKING, CONTROL AND SYNTHESIZING OF MANUFACTURING PERFORMANCE FIGURES

Gheorghe Barna; Silviu Stefan; Mircea Suselescu; Cornelius Barbu; Sergiu Chiose; Ioan Lebada, and Florian Negulescu, all of Bucharest, Romania, assignors to Institutul de Proiectari Tehnologice al Industriei Usoare and Fabrica de Stofe de Mobila, both of Bucharest, Romania

Filed Mar. 31, 1976, Ser. No. 672,503

Int. Cl.[2] G06F *15/36, 15/46*

U.S. Cl. 364—551 **3 Claims**



1. A system for the automatic supervision of a multiplicity of machines in a manufacturing plant, comprising:

a multiplicity of electromechanical transducer units each associated with a respective machine to be supervised for generating coded information indicative of the performance of the machine;

a multiplicity of couplers respectively connected to said transducer units;

scanning means for sequentially activating said couplers to read out said coded information to a common transmission line;

recording means connected to said transmission line for storing on a first carrier the coded information sequentially read out;

evaluation means for processing the information so stored, said evaluation means including a computer receiving said first carrier and emitting the evaluation results on a second carrier;

a reader responsive to the contents of said second carrier; and

display means connected to said reader.

4,089,057

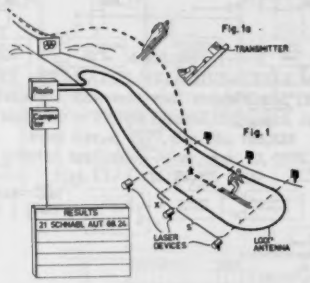
METHOD AND DEVICE FOR MEASURING JUMP-LENGTHS ON A SKI-JUMP

Karl Erik Eriksson, Sturegatan 37A, 2tr., 791 00 Falun, Sweden

Filed Jan. 17, 1977, Ser. No. 759,918

Int. Cl.[2] G01B *7/00;* **G06F** *7/38*

U.S. Cl. 364—562 **9 Claims**



4. A device for measuring jump lengths on a ski-jump where a skier wearing skis jumps from a first elevation to a second elevation at ground including:

(a) landing transducer means attached to a skier's ski including a radio transmitter and shock sensitive means for activating said transmitter upon impact;

(b) a stationary radio receiver tuned to said transmitter;

(c) at least a first and a second optical unit mounted a predetermined distance apart along the second elevation of the ski-jump course, each said optical unit comprising an optical transmitter at ground emitting an optical beam across the ski-jump course and an optical transducer so mounted as to receive said optical beam;

(d) means for determining the ski-jumper's speed immediately after landing, said means being interconnected to said radio receiver and said optical units;

(e) an electronic unit coupled to the radio receiver, the optical units and the means for determining the ski-jumper's speed, said electronic unit including time determination means for calculating the time difference between the moment of first landing of the skier and interruption by the skier of the beam emitted by the first optical unit, and for determining the time difference between a first and second signal from the same optical unit, said electronic unit being interconnected to and receiving data from said means for determining the skiers speed said optical units and said radio receiver, said electronic unit also containing fixed logic means for calculating the ski-jump length from the data entered into the electronic unit from said optical units, said radio receiver and said means for determining the ski-jumper's speed.

4,089,058

REAL TIME DATA PROCESSING AND DISPLAY SYSTEM FOR NON-LINEAR TRANSDUCERS

Douglas B. Murdock, Bellevue, Wash., assignor to Resource Control Corporation, Redmond, Wash.

Filed Dec. 6, 1976, Ser. No. 747,779

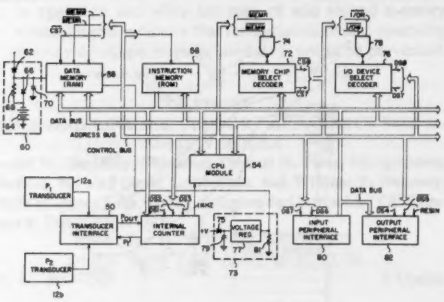
Int. Cl.[2] G01F *15/02*

U.S. Cl. 364—571 **15 Claims**

1. A real time system for providing a visual indication of a physical variable measured by a non-linear transducer, said physical variable being a known function of a time related characteristic of the signal at the output of said transducer, comprising:

interval counter means receiving the output of said transducer, periodically measuring the time related characteristic of said transducer output, and generating a counter output signal indicative of said time related characteristic for each measurement;

processing means receiving said counter output signal for each measurement, calculating the value of said physical variable corresponding to said time related characteristic according to said known function, and providing an output signal indicative of said physical variable; and



output means receiving the output of said processing means and providing an indication of said physical variable for each measurement.

4,089,059

PROGRAMMABLE CALCULATOR EMPLOYING A READ-WRITE MEMORY HAVING A MOVABLE BOUNDARY BETWEEN PROGRAM AND DATA STORAGE SECTIONS THEREOF

Bradley W. Miller; Franklin T. Hickenlooper; David C. Uhlrich; Marl D. Godfrey; Douglas M. Clifford; Rex L. James; Robert E. Watson; John C. Keith, and Alan C. Mortensen, all of Loveland, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 21, 1975, Ser. No. 597,957
Int. Cl.[2] G06F *9/06*
U.S. Cl. 364—706 **6 Claims**

1. An electronic calculator comprising:

memory means for storing instructions and data, said memory means including a program storage area for storing program instructions and a data storage area for storing data;

keyboard input means for entering information including data and instructions into the memory means;

processing means, coupled to said keyboard input means and memory means, for processing data and instructions entered into the memory means to perform selected functions;

output means, coupled to said processing means, for providing an output indication of selected functions performed by the calculator; and

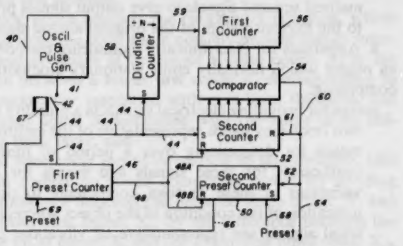
logic means, coupled to said memory means and processing means, for defining a movable boundary between said program storage area and said data storage area of said memory means.

4,089,060

DIGITAL LOGARITHMIC APPARATUS

Donald K. Mitchell, 13133 E. 23 St., Tulsa, Okla. 74114

Filed Oct. 15, 1976, Ser. No. 732,740
Int. Cl.[2] G06F *15/34*; H03K *3/78*
U.S. Cl. 364—722 **5 Claims**



1. Digital electronic apparatus having an input adapted to receive electrical pulses, and having an output for delivering electrical pulses, in which the number of output pulses X is approximately related to the number of input pulses Y in accordance with an equation of the form;

$$X = W \operatorname{Log}_z(Y) + K$$

where

W and K are numerical constants, comprising:

(a) a source of electrical pulses;

(b) said source connected to the input of a dividing counter;

(c) said dividing counter on its output connected to a first counter, said first counter incremented by one pulse for each N pulses to said dividing counter;

(d) said source connected also to a second counter;

(e) comparator means to compare the counts of said first and second counter, and means responsive to said comparator means to generate an output pulse (on) when the count of said second counter is at least equal to the count of said first counter, and

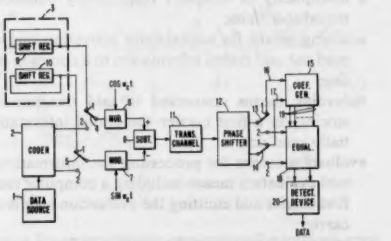
(f) means responsive to each output pulse to reset said second counter to zero.

4,089,061

METHOD AND APPARATUS FOR DETERMINING THE INITIAL VALUES OF THE COEFFICIENTS OF A COMPLEX TRANSVERSAL EQUALIZER

Andrzej Tadeusz Milewski, Saint-Jeannet, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1976, Ser. No. 743,022
Claims priority, application France, Dec. 30, 1975, 75 40417
Int. Cl.[2] H04B *3/04*
U.S. Cl. 364—724 **12 Claims**



1. A method for determining the initial values of the coeffici-

ents of a complex transversal equalizer in a synchronous data transmission system employing Double Side Band-Quadrature Carrier (DSB-QC) modulation on a transmission channel having variable distortion from message to message, said initial values of the coefficients being derived from a received training sequence comprising the steps of:

generating a CAZAC sequence with is a periodic psuedo-random sequence of complex numbers all of which have a constant amplitude said sequence having a periodic auto-correlation function all the coefficients of which except the first are zero,

modifying said CAZAC sequence to provide a modified CAZAC sequence in the form of a resultant signal which is a complex signal representing the real and imaginary parts of said CAZAC sequence, transmitting said modified CAZAC sequence over said transmission channel during a training period, and

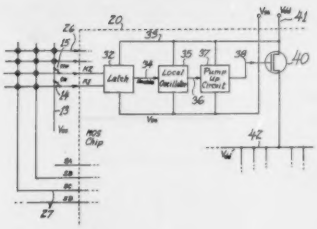
determining the initial values of said coefficients of said complex transversal equalizer from said modified CAZAC sequence during said training period.

4,089,062

SWITCHING CONTROL CIRCUITS FOR ELECTRONIC CALCULATOR WITH PUSH-BUTTON ON-OFF SYSTEM

David J. McElroy; Graham S. Tubbs, both of Houston, and Charles J. Southard, Bellaire, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 28, 1976, Ser. No. 700,672
Int. Cl.² G06F 1/00
U.S. Cl. 364—700 **21 Claims**



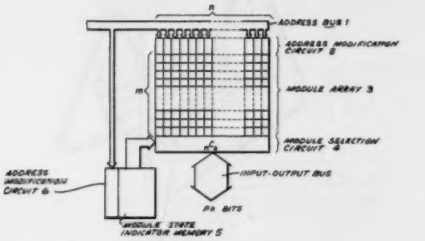
1. In a battery-operated electronic device, having a plurality of push-button momentary contact switches in a keyboard and a large-scale-integrated semiconductor device coupled to the keyboard by a plurality of conductors and having electronic circuitry within the semiconductor device for processing information entered by the switches; power switch apparatus including a bistable latch circuit continuously powered by the battery, a semiconductor control element included in the power switch apparatus responsive to the condition of the latch circuit and exhibiting a low impedance when the latch is in the other condition, coupling means connecting a first of the keyswitches to the latch circuit to cause the latch circuit to switch to said one condition upon actuation of the push-button keyswitch, and means connecting said electronic circuitry to the battery only through the semiconductor control element; the improvement comprising an oscillator included in the power switch apparatus having an input connected to receive an output of the latch circuit and effective to produce high frequency oscillations only when the latch circuit is in said one condition, and a pump circuit included in the power switch apparatus connected to receive the output of the oscillator and effective to produce a continuous DC level greater than that of the battery when the oscillations exist and means connecting the output of the pump circuit to the semiconductor control element.

4,089,063

MEMORY APPARATUS WITH DEFECTIVE MODULES

Takashi Takezono, Kawasaki, and Takashi Kanie, Tama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Apr. 8, 1977, Ser. No. 785,825
Claims priority, application Japan, Apr. 12, 1976, 51-41454
Int. Cl.² G11C 29/00, 8/00
U.S. Cl. 365—200 **8 Claims**



1. Memory apparatus, comprising

a module array having a plurality of memory modules, each having at least one memory cell, arranged in a matrix of *m* rows and *n* columns;

address input means for providing row addresses for each column of the array from outside said memory apparatus;

address modification means for each column of the module array for modifying the row addresses provided for each column of the array to provide new addresses;

address decoding means in the array connected to the address modification means for selecting the modules of each column of the array, one by one, in accordance with the new addresses;

module state indicator means in the array connected to the address decoding means and having memory means of at least one bit corresponding to each module of all the rows and all the columns of the array, except one border column, for indicating the good or defective condition of each module when accessed at the time the module is accessed;

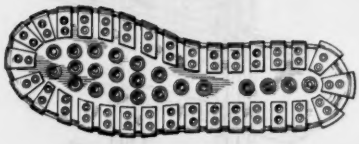
module selection means connected to the module state indicator means and to the array for selecting only a specified number of good modules from *n* modules accessed simultaneously according to the indication of the module state indicator; and

input-output means connected by the module selection means to the good modules selected by the module selection means.

DESIGNS

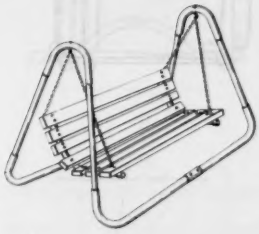
MAY 9, 1978

247,831
SHOE SOLE
Joseph P. Famolare, Jr., Florence, Italy, assignor to Famolare, Inc., New York, N.Y.
Filed Apr. 2, 1976, Ser. No. 673,218
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320

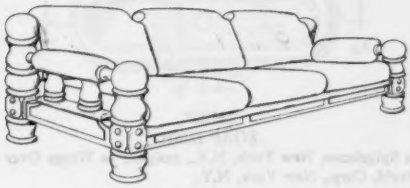


247,832
SHOE BOTTOM UNIT
Robert R. Glasgow, Granite City, Ill., and Harry R. Nieters, St. Louis, Mo., assignors to Brown Group, Inc., St. Louis, Mo.
Filed Oct. 29, 1976, Ser. No. 737,151
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—321

247,833
PATIO SWING OR SIMILAR ARTICLE
Robert B. Kearns, Shaker Heights, and James L. Humphries, Painesville, both of Ohio, assignors to Production Experts, Inc., Cleveland, Ohio
Filed Sep. 20, 1976, Ser. No. 724,566
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—52



247,834
SOFA
Lester Beall, Jr., High Point, N.C., assignor to Crestline Furniture Company, Inc.
Filed Oct. 22, 1976, Ser. No. 734,951
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—62



247,835
UPHOLSTERED SEAT
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti
Filed Mar. 15, 1976, Ser. No. 667,158
Claims priority, application Italy, Sep. 15, 1975, 60934 B/75
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—67

247,836

UPHOLSTERED SEAT

Alberto Rosselli, Milan, Italy, assignor to Fratelli Saporiti

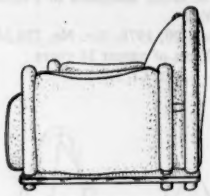
Filed Mar. 15, 1976, Ser. No. 667,157

Claims priority, application Italy, Sep. 15, 1975, 60933/75[U]

Term of patent 14 years

Int. Cl. D6—*01*

U.S. Cl. D6—71



247,837

SOAP DISH

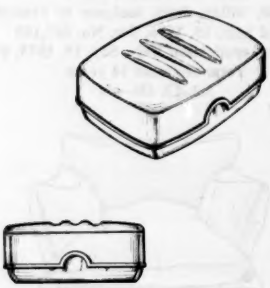
Alan Spigelman, New York, N.Y., assignor to Wings Over the World, Corp., New York, N.Y.

Filed Mar. 25, 1977, Ser. No. 781,282

Term of patent 7 years

Int. Cl. D23—*02;* D9—*03*

U.S. Cl. D6—89



247,838

SUSPENDIBLE PLANT RACK

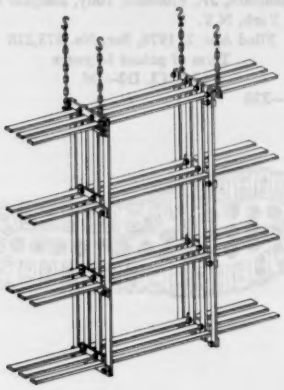
William M. Jones, and John H. Jones, both of 8505 Tioga Ave., Cleveland, Ohio 44105

Filed Jul. 20, 1977, Ser. No. 817,202

Term of patent 14 years

Int. Cl. D6—*06, 04*

U.S. Cl. D6—113



247,839

COMBINED CUP AND COASTER/COVER OR THE LIKE

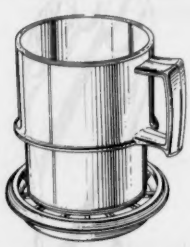
Harold P. Ashton, Providence, R.I., assignor to Dart Industries, Inc., Los Angeles, Calif.

Filed Jun. 14, 1976, Ser. No. 695,619

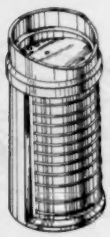
Term of patent 14 years

Int. Cl. D7—*01*

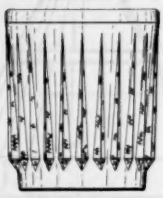
U.S. Cl. D7—3



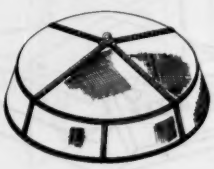
247,840
TRAINING CUP
Fred L. Dixson, Ft. Collins, Colo., assignor to Teledyne Industries, Inc., Ft. Collins, Colo.
Filed Nov. 22, 1976, Ser. No. 743,713
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—6



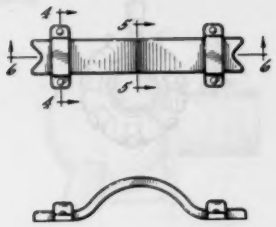
247,841
BEVERAGE TUMBLER
Eric J. Seres, Holly, Mich., assignor to Incoe Corporation
Filed Nov. 19, 1976, Ser. No. 743,453
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—14



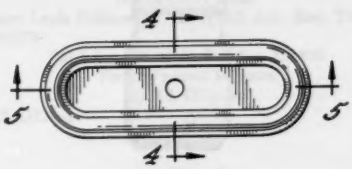
247,842
SUNSHADE FOR PLANTS
Robert M. McClung, 5422 Ludlow, Garden Grove, Calif. 92645
Filed Jun. 7, 1976, Ser. No. 693,288
Term of patent 14 years
Int. Cl. D11—*99*; D26—*05*
U.S. Cl. D8—1



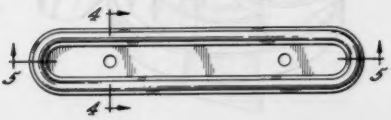
247,843
PULL
Teresa R. B. Pittenger, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,524
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—317



247,844
ESCUTCHEON
James M. Palm, Jr., Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,472
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—352



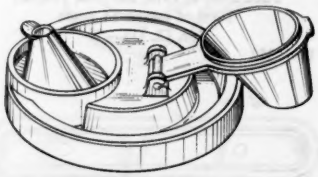
247,845
ESCUTCHEON
James M. Palm, Jr., Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,581
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—352



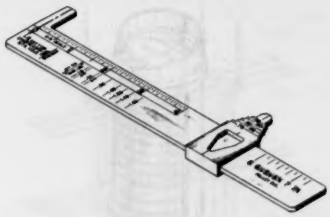
247,846
ATOMIZER
Leonard R. Kortick, 88 Waldron Ave., Cranston, R.I. 02910
Filed Apr. 28, 1976, Ser. No. 681,128
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—3

247,847
BOTTLE
Edward Joseph Kretz, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Jun. 1, 1976, Ser. No. 691,661
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—100

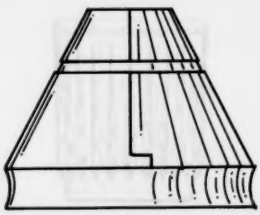
247,848
CONTAINER CLOSURE OR THE LIKE
Jack V. Croyle, Woonsocket, R.I., assignor to Dart Industries, Inc., Los Angeles, Calif.
Filed May 7, 1976, Ser. No. 684,341
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—275



247,849
CLUTCH PULLEY MEASURING DEVICE
William C. Pierce, 9714 Lanward Dr., Dallas, Tex. 75238, and Raymond E. Porter, 4830 Blaney, Fort Worth, Tex. 76118
Filed Jun. 28, 1976, Ser. No. 700,201
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—73



247,850
SEPARABLE CONTAINER FOR FLOWERS, SHRUBS, OR THE LIKE
Edward L. Cicero, 52-62 66 St., Maspeth, N.Y. 11378
Filed Sep. 17, 1976, Ser. No. 724,466
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—152



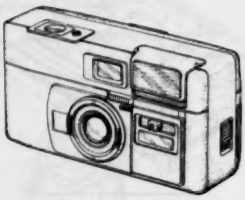
247,851
HOUSING FOR A TELEPHONE ANSWERING DEVICE
Willy Muller, 13, Guggerstrasse, 8702 Zollikon, Switzerland
Filed Feb. 4, 1976, Ser. No. 655,111
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—4

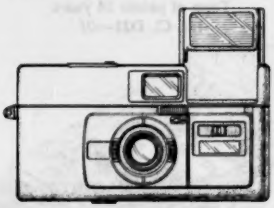
247,852

FLASH CAMERA

Hiroshi Fukuda, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sep. 24, 1976, Ser. No. 726,342
Claims priority, application Japan, Jul. 23, 1976, 51-28927
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06



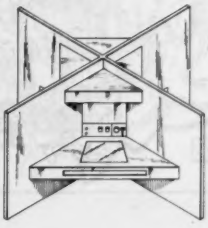


247,853

MULTIPLEXED ELECTROSTATIC COPIER HAVING PLURAL SCAN STATIONS AND COMMON DEVELOPMENT

Alfred B. Levine, 2924 Terrace Dr., Chevy Chase, Md. 20015

Filed Oct. 26, 1976, Ser. No. 735,531
Term of patent 14 years
Int. Cl. D16—*03*; D6—*03*
U.S. Cl. D16—27

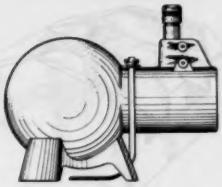


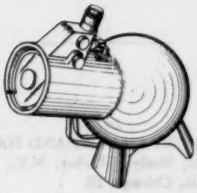
247,854

TELESCOPE

Michael Simmons, Hockessin, Del., and Peter W. Bressler, Philadelphia, Pa., assignors to Edmund Scientific Company, Barrington, N.J.

Filed Jun. 24, 1976, Ser. No. 699,428
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—60





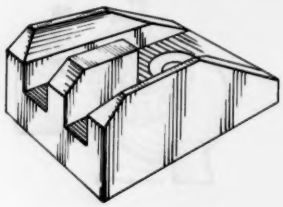
247,855

HANDGUN GRIP

Theodore Louis Schiermeier, 1417 11th Ave. East, Twin Falls, Id. 83301

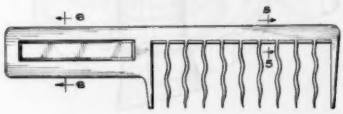
Filed Aug. 23, 1976, Ser. No. 716,890
Term of patent 14 years
Int. Cl. D22—*01*
U.S. Cl. D22—1

247,856
GUN SIGHT
Robert Korzeniewski, 115 N. Live Oak St., Carthage, Tex. 75633
Filed Mar. 7, 1977, Ser. No. 774,879
Term of patent 14 years
Int. Cl. D22—*01*
U.S. Cl. D22—8

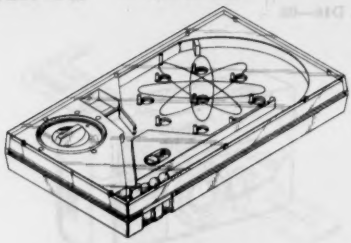


247,857
COMBINED DRY SHAVER AND HAIR CLIPPER
Arthur P. Stevens, Roslyn Harbor, N.Y., assignor to Sears, Roebuck and Co., Chicago, Ill.
Filed Oct. 21, 1976, Ser. No. 734,502
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—50

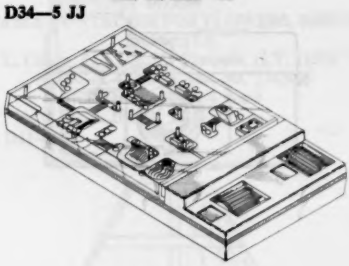
247,858
HAIR STYLING COMB
Hector R. Moya, 5075 Nicholson La., Rockville, Md. 20852
Filed Jun. 24, 1976, Ser. No. 699,461
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—30



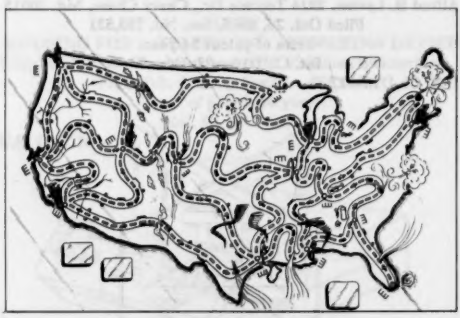
247,859
POCKET AMUSEMENT DEVICE BOX
Katsumi Sato, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Sep. 17, 1976, Ser. No. 724,076
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ



247,860
POCKET DRIVING GAME BOX
Hitoshi Itakura, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Sep. 17, 1976, Ser. No. 724,071
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ

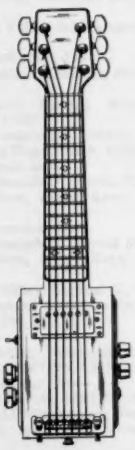


247,861
GAME BOARD
Robert O. McCollom, 720 Arden, Encinitas, Calif. 92024, and Nicholas L. Fix, Solana Beach, both of Calif., assignors to Patrick R. McCollom and Robert B. McCollom
Filed Sep. 17, 1976, Ser. No. 724,478
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

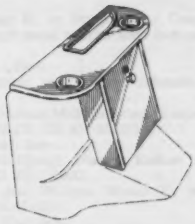


247,862
TOY VEHICLE WITH REMOVABLE HANDLE
Shinroku Nakao, Yokohama; Yoshiyasu Ishii, and Hiroaki Matsuda, both of Tokyo, all of Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Apr. 27, 1976, Ser. No. 680,560
Claims priority, application Japan, Nov. 4, 1975, 50-43787
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AN

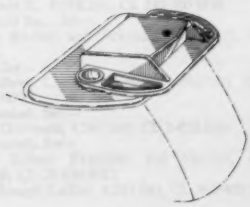
247,863
ELECTRIC MINI-GUITAR
Michael W. Sasaki, 3006 Logan St., Oakland, Calif. 94601, and Warren D. Sasaki, 5531 Alameda Ave., Richmond, Calif. 94804
Filed Jun. 23, 1976, Ser. No. 698,910
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A



247,864
CONSOLE FOR MOTOR COVER OF A MOTOR VEHICLE
Larry R. Wynn, New Brighton, Pa., assignor to Luce Industries, Inc., Ashtabula, Ohio
Filed Nov. 17, 1976, Ser. No. 742,683
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D87—1 R



247,865
CONSOLE FOR MOTOR COVER OF A MOTOR VEHICLE
Larry R. Wynn, New Brighton, Pa., assignor to Luce Industries, Inc., Ashtabula, Ohio
Filed Nov. 17, 1976, Ser. No. 742,684
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D87—1 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 9TH DAY OF MAY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A-Lok Corporation: *See—*
Ditcher, John, 4,088,361, Cl. 294-89.000.

A. Nattermann & Cie GmbH: *See—*
Muller, Klaus Peter, 4,088,539, Cl. 195-66.00R.

A/S Hoyer-Ellefsen: *See—*
Mo, Olav, 4,087,984, Cl. 61-94.000.

Aaltonen, Olavi August: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.

AB Volvo Penta: *See—*
Paul, Cornelis, 4,088,038, Cl. 74-479.000.

AB Ziristor: *See—*
Stark, Olof S.; and Martensson, Kjell H., 4,088,260, Cl. 229-17.00R.

Abbott Laboratories: *See—*
Winn, Martin; and Kyncl, Jaroslav, 4,088,765, Cl. 424-258.000.

Abe, Nobuo; and Sugawara, Hiroyuki, to Hitachi, Ltd. Vacuum interrupter for high voltage application. 4,088,860, Cl. 200-144.00B.

ABU Aktiebolag: *See—*
Karlsson, Jarding Urban; and Blomgren, Gerth Karl Anders, 4,088,279, Cl. 242-84.10R.

Acricite Company, Inc.: *See—*
Schwartz, Lawrence B., 4,088,167, Cl. 150-33.000.

Acrometal Products, Inc.: *See—*
Tebben, Lloyd W., 4,088,856, Cl. 200-52.00R.

Adair, Henry, to Memorex Corporation. Reel for magnetic recording tape. 4,088,278, Cl. 242-71.800.

Addor, Roger William: *See—*
Kameswaran, Venkataraman; and Addor, Roger William, 4,088,782, Cl. 424-304.000.

Adkins, Russell M., to Westinghouse Air Brake Company. Shielded connectors for closely spaced terminals. 4,088,385, Cl. 339-143.00R.

Adler, Karl-Heinz; Drews, Ulrich; Werner, Peter; Moller, Heinz; and Kammerer, Heinz, to Robert Bosch GmbH. Interference-protected, switch-controlled square wave generation circuit. 4,088,927, Cl. 315-209.00T.

Advanced Controls Corp.: *See—*
Kosmowski, Wojciech, 4,088,417, Cl. 408-1.0BD.

Aeritalia S.p.A.: *See—*
Paulsen, Donald E., 4,089,040, Cl. 361-383.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Aubert, Georges, 4,087,886, Cl. 17-52.000.
Michelson, Adolf Michael; and Rotter, Philippe, 4,088,595, Cl. 252-95.000.

Agency of Industrial Science & Technology: *See—*
Anzai, Shunichi; Uenishi, Akira; and Sakamoto, Takeshi, 4,088,183, Cl. 165-104.00S.
Suzuki, Hiroshi; Ito, Yukio; and Yasumoto, Yosiro, 4,088,611, Cl. 252-541.000.

Agfa-Gevaert Aktiengesellschaft: *See—*
Krafft, Werner; Matschke, Gunther; and Wolff, Erich, 4,088,493, Cl. 96-77.000.
Odenwalder, Heinrich; Puschel, Walter; and Ranz, Erwin, 4,088,491, Cl. 96-55.000.
Pustka, Karel; and Vondrovsky, Gabriel, 4,088,405, Cl. 355-71.000.
Zahn, Wolfgang; and Nagel, Erich, 4,088,404, Cl. 355-29.000.

Ahlborn, John C., deceased: *See—*
Wiese, Harry C.; Denchfield, Jerrold R.; Ahlborn, John C., deceased; and Ahlborn, Lloyd Keys, executor, 4,088,453, Cl. 44-51.000.

Ahlborn, Lloyd Keys, executor: *See—*
Wiese, Harry C.; Denchfield, Jerrold R.; Ahlborn, John C., deceased; and Ahlborn, Lloyd Keys, executor, 4,088,453, Cl. 44-51.000.

Ahlquist, Gary W.; and Milley, Michael K., to Eastman Kodak Company. Length measurement apparatus for continuously advancing articles. 4,088,411, Cl. 356-167.000.

Aikawa, Takayuki: *See—*
Ohba, Shintaro; Hirose, Nobuhiko; Sugihara, Nobuhiro; and Aikawa, Takayuki, 4,087,889, Cl. 24-129.00W.

Airmatic/Beckett-Harcum, Inc.: *See—*
Scholefield, Edward Harold, 4,087,897, Cl. 29-509.000.

Akademiet for de Tekniske Videnskaber, Svejsecentralen: *See—*
Iversen, Sven Erik; and Lund, Svend Aage, 4,088,030, Cl. 73-629.000.
Lund, Svend Aage; Kongshavn, Erik; and Ostgaard, Erik, 4,088,866, Cl. 219-137.00R.

Akado, Hajime; Kawashima, Yutaka; Yamaguchi, Akihide; and Matsuura, Hideki, to Nippondenso Co., Ltd. Exhaust gas cleaning device. 4,087,966, Cl. 60-278.000.

Albert, Roosevelt A.: *See—*
Hickmann, Horst R.; and Albert, Roosevelt A., 4,087,867, Cl. 3-13.000.

Albertson, Clarence E., to Borg-Warner Corporation. Method for producing a coated metal nodular solar heat collector. 4,088,547, Cl. 204-32.00R.

Alfa Romeo S.p.A.: *See—*
Bossi, Gianfranco; and Rogora, Edoardo, 4,088,096, Cl. 123-32.0EE.

Alferes, Ernest, to Hansen Manufacturing Company, The. Gas distribution system. 4,088,436, Cl. 431-21.000.

Alfred Teves GmbH: *See—*
Knoblauch, Wolfgang; Mucke, Rainer; and Salvador, Rene, 4,088,590, Cl. 252-73.000.

Aliment, Lindy; and Phillips, Manio L. Multipurpose bracket. 4,088,294, Cl. 248-519.000.

Allen Group Inc., The: *See—*
Barber, Ivan J., 4,087,877, Cl. 15-97.00B.

Allen, Norman R.: *See—*
Wineburner, Ronald E.; and Allen, Norman R., 4,088,305, Cl. 254-187.500.

Allied Chemical Corporation: *See—*
Homme, Arthur C., Jr., 4,088,742, Cl. 423-522.000.
Nychka, Henry R.; and Eibeck, Richard E., 4,088,704, Cl. 260-653.000.
Pieters, Wim Johan Meindert; Gates, William Ellis; Carlson, Emery John; and Wilkalis, John Edward, 4,088,705, Cl. 260-653.700.
Sukornick, Bernard; and Beal, James B., 4,088,517, Cl. 149-1.000.
Yeh, Chuen Y.; Bohn, F. Lewis; and Ulmer, Harry E., 4,088,703, Cl. 568-835.000.

Allied Colloids Limited: *See—*
Smalley, Graham; Frost, David A.; and Rothwell, Eric, 4,088,584, Cl. 252-8.55D.

Allis-Chalmers Corporation: *See—*
Slazas, John J.; and Gunther, Arno, 4,087,970, Cl. 60-487.000.

Alpha Nova Development Corp.: *See—*
D'Arca, Stephen S., 4,088,081, Cl. 108-27.000.

Alsberg, Henry: *See—*
Skalla, Dale; Meisenhelder, William C.; and Alsberg, Henry, 4,088,617, Cl. 260-23.0ST.

Aluminum Company of America: *See—*
La Bar, Richard G., 4,088,502, Cl. 106-64.000.

Alza Corporation: *See—*
Theeuwes, Felix; Saunders, Richard J.; and Mefford, Wayne S., 4,088,864, Cl. 219-121.0LM.

Amberg, Stephen W.; and Doherty, Thomas E., to Owens-Illinois, Inc. Apparatus for fabricating thermoplastic containers. 4,088,526, Cl. 156-446.000.

Amdal, Dagfinn O., to Keystone Consolidated Industries, Inc. Door support. 4,087,883, Cl. 16-82.000.

American Can Company: *See—*
Detroit, William John, 4,088,640, Cl. 260-124.00R.

American Cyanamid Company: *See—*
Asato, Goro; and Bentley, Terence James, 4,088,786, Cl. 424-322.000.
Fanshawe, William Joseph; Epstein, Joseph William; Crawley, Lantz Stephen; Hofmann, Corris Mabelle; and Safir, Sidney Robert, 4,088,652, Cl. 260-293.540.
Giglia, Robert Domenico, 4,088,395, Cl. 350-357.000.
Kameswaran, Venkataraman; and Addor, Roger William, 4,088,782, Cl. 424-304.000.
Meyers, Marion Douglas, 4,088,392, Cl. 350-357.000.

American Hoechst Corporation: *See—*
Sonnenberg, Fred Max, 4,088,683, Cl. 260-543.00R.

American Machine & Hydraulics, Inc.: *See—*
Watling, Leighton Harvey; and Henthorn, Donald R., 4,088,008, Cl. 72-481.000.

American Safety Equipment Corporation: *See—*
Close, Albert R., 4,088,281, Cl. 242-107.000.

American Velcro Inc.: *See—*
Hasslinger, Russell; and Pickering, Keldon S., 4,088,136, Cl. 128-349.00R.

Ametek, Inc.: *See—*
Hyatt, Robert L.; and Niessner, Norbert H., 4,088,424, Cl. 417-368.000.

AMF Incorporated: *See—*
Garofalo, Giovanni, 4,087,865, Cl. 2-428.000.

AMP Incorporated: *See—*
Cobaugh, Robert Franklin; and Parmer, Kenneth Ronald, 4,087,906, Cl. 29-630.00D.
Lockard, Joseph LaRue, 4,089,041, Cl. 361-403.000.

Anderson, Charles Hammond: *See—*
Siekanowicz, Wieslaw Wojciech; Anderson, Charles Hammond; and Credelle, Thomas Lloyd, 4,088,920, Cl. 313-422.000.

Anderson, Donald E., to Suntec Systems, Inc. Solar concentrator-collector. 4,088,120, Cl. 126-271.000.

Anderson, John E.; and Burkholder, Ward J., to Goodyear Tire & Rubber Company, The. Production of aralkyl tertiary hydroperoxides. 4,088,699, Cl. 260-610.00B.

Anderson, Maynard L.: *See—*
Savins, Joseph George; and Anderson, Maynard L., 4,087,936, Cl. 47-1.400.

Anderson, Norman L., to United States of America, Energy. Apparatus for electrophoresis separation. 4,088,561, Cl. 204-299.00R.

Anderson, Willard W.; and Groom, Nelson J., to United States of America, National Aeronautics and Space Administration. Magnetic suspension and pointing system. 4,088,018, Cl. 73-178.00R.

Andersson, Allan. Planing tool. 4,088,165, Cl. 145-5.00R.

Andreas Stihl Maschinenfabrik: *See—*
Ratz, Adolf; Wilhelm, Adolf; Odenwald, Gerhard; Frank, Siegfried; and Stark, Walter, 4,088,047, Cl. 76-112.000.

Andreeva, Natalia Ivanovna: *See—*
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

Andrew, Keith V., to G.C. Barnes Tooling and Mfg. Co., Inc. Method and means of straightening cycle frames. 4,088,002, Cl. 72-389.000.

Andrews, Laurance Richardson, to United Technologies Corporation. Electrode assembly and machine for small-hole electrochemical drilling. 4,088,557, Cl. 204-224.00M.

Andrews, Lawrence F. Orthodontic safety face bow. 4,087,915, Cl. 32-14.00D.

Andrews, Timothy Douglas: *See—*
Pope, John Anthony; and Andrews, Timothy Douglas, 4,088,492, Cl. 96-75.000.

Andrieu, Jean-Louis; and Delafosse, Jacques, to Commissariat a l'Energie Atomique. Casing for the fuel elements of a water-cooled nuclear reactor. 4,088,534, Cl. 176-38.000.

Anglian Water Authority: *See—*
Smith, Fred, 4,088,449, Cl. 23-283.000.

Antech Industries: *See—*
Tech, Donald D., 4,088,836, Cl. 179-1.0MN.

Antich, Paul J. Anti-flapping device for window coverings. 4,088,173, Cl. 160-238.000.

Anzai, Shunichi; Uenishi, Akira; and Sakamoto, Takeshi, to Agency of Industrial Science & Technology. Thermal energy storage tank. 4,088,183, Cl. 165-104.00S.

Aoki, Kanemasa, to Canon Kabushiki Kaisha; and Canon Seiki Kabushiki Kaisha. Electric motor. 4,088,914, Cl. 310-264.000.

Aono, Shigeo, to Nissan Motor Company, Limited. Closed-loop mixture control system for an internal combustion engine using a differential amplifier with a reference voltage variable according to engine operating parameters. 4,088,095, Cl. 123-32.0EE.

Apicella, Anthony M., Jr., to Goodyear Tire & Rubber Company, The. Method and apparatus for controlling the thickness of extruded stock. 4,088,721, Cl. 264-40.400.

Appel, Mel, to Proll Molding Co., Inc. Molded plastic toy stringed instrument. 4,088,050, Cl. 84-267.000.

Applegate, Leslie T., to Surgical Appliance Industries, Inc. Hinge for knee brace. 4,088,130, Cl. 128-80.00F.

Aquila, Joseph. Lift for small vehicles. 4,088,303, Cl. 254-88.000.

Arai, Haruhiko; and Nakasone, Yumio, to Kao Soap Co., Ltd. Method of treating drains. 4,088,596, Cl. 252-99.000.

Arai, Kenichiro: *See—*
Shindo, Takemasa; Ito, Yoshikazu; and Arai, Kenichiro, 4,088,214, Cl. 400-120.000.

Arbman Development AB: *See—*
Helgesson, Claes Ivar, 4,088,571, Cl. 210-17.000.

Archer, Robert A.; and Lemberger, Louis, to Eli Lilly and Company. Hexahydro-dibenzo[b,d]pyran-9-ones as anticonvulsant drugs. 4,088,777, Cl. 424-283.000.

Ardel Kinamatic: *See—*
Edelstein, Arthur, 4,088,396, Cl. 350-252.000.

Ardyshev, Valentin Nikitich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.

Arlauskas, Alfonsas; and Loose, Richard D., to General Motors Corporation. Inertia seat back lock. 4,088,280, Cl. 242-107.000.

Arlt, Dieter: *See—*
Uhrhan, Paul; Lantzsch, Reinhard; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,088,629, Cl. 260-45.80N.

Armas, Eduardo Santana. Apparatus for molding the interior of building modules. 4,088,296, Cl. 249-180.000.

Armstrong, Frederick J.; and Susdorf, Robert A., to General Electric Company. Permanent magnet D.C. dynamoelectric machine and method of making same. 4,088,177, Cl. 164-109.000.

Arrow-Hart (Europe) Limited: *See—*
Milcoy, Edgar Albert Philip, 4,088,829, Cl. 174-53.000.

Artamonov, Viktor Leonidovich: *See—*
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Ishida, Torao; Nishimura, Daikichi; Sugawara, Toshiaki; and Ooka, Tadaaki, 4,088,646, Cl. 544-313.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Kawasaki, Masahiro, 4,089,012, Cl. 354-23.00D.
Uno, Naoyuki; and Kawasaki, Masahiro, 4,089,015, Cl. 354-51.000.

Asai, Shojiro; Masuhara, Toshiaki; and Kaneko, Kenji, to Hitachi, Ltd. Electron device. 4,089,022, Cl. 357-23.000.

Asano, Seiji, to Fuji Photo Optical Co., Ltd. Data recording camera. 4,089,018, Cl. 354-106.000.

Asato, Goro; and Bentley, Terence James, to American Cyanamid Company. Method for utilizing tetrahydro-4-imino-1-naphthylureas as growth promoting agents for animals. 4,088,786, Cl. 424-322.000.

Asbeck, Volker: *See—*
Berwald, Ernst; and Asbeck, Volker, 4,088,238, Cl. 220-1.500.

ASEA Aktiebolag: *See—*
Dahle, Orvar; Von Knorring, Folke; Nordvall, Jan; and Siby, Sture, 4,088,013, Cl. 73-141.00A.

Ashley, Albert H., to GTE Sylvania Incorporated. Operational amplifier driver circuit. 4,088,961, Cl. 330-53.000.

Assouline, Georges; Hareng, Michel; Roncillat, Michel; and Leiba, Eugene, to Thomson-CSF. Display devices. 4,088,400, Cl. 353-20.000.

Atkinson, Thomas Carl; and Fay, Clifford C., to Rohr Industries, Inc. Vehicle seat assembly. 4,088,367, Cl. 297-457.000.

Atlantic Richfield Company: *See—*
Howell, Eddie P.; Gant, Orland J., Jr.; Hearn, Daniel P.; and Coffee, Robert D., 4,088,945, Cl. 324-10.000.

Atlas Copco Aktiebolag: *See—*
Emanuelsson, Kaj Bengt Ingemar; and Eriksson, Sven Evald, 4,088,427, Cl. 418-201.000.
Lavon, Erik Volmar; and Karlfors, Levi Johannes, 4,088,368, Cl. 299-13.000.

Aubert, Georges, to Agence Nationale de Valorisation de la Recherche (ANVAR). Automatic evisceration process for animal carcasses. 4,087,886, Cl. 17-52.000.

Auerbach, Albert A., to Medalert Corporation. Automatic detection and registration of failure condition in a cardiac pacer monitoring system. 4,088,139, Cl. 128-419.0PT.

Auergesellschaft GmbH: *See—*
Brauer, Lothar W., 4,088,461, Cl. 55-275.000.

Aupac Kabushiki Kaisha: *See—*
Yoshida, Makoto, 4,088,912, Cl. 310-244.000.

Austin, Buddy Julian, to Roper Corporation. Timer operated control circuit for a microwave oven. 4,088,862, Cl. 219-10.55B.

Australian Atomic Energy Commission: *See—*
Hunt, Frederick Charles; and Wilson, John Gerald, 4,088,747, Cl. 424-1.000.

Automatic Material Handling, Inc.: *See—*
Keller, Alex J., 4,087,882, Cl. 15-301.000.

Automatic Parking Devices, Inc.: *See—*
Schasser, Donald S., 4,088,878, Cl. 235-436.000.

Automobiles Peugeot: *See—*
Etienne, Michel, 4,087,895, Cl. 29-252.000.
Zoursel, Pierre Edouard, 4,088,398, Cl. 350-280.000.

Avco Corporation: *See—*
Junker, Arnold E., 4,088,329, Cl. 277-26.000.

Avery, Paul A., to Woodward Governor Company. Fuel control system for gas turbine engine operated on gaseous fuel. 4,087,961, Cl. 60-39.28R.

Axman, Michael P. Automatic modulation percentage control for amplitude modulated transmitters. 4,088,956, Cl. 325-159.000.

Ayash, Karl B., to Xerox Corporation. Extended range color electrophotographic method by superimposing a half-tone image on a low density continuous tone image. 4,088,481, Cl. 96-1.400.

Azevedo, Maximino S.: *See—*
Harris, Alva F.; and Azevedo, Maximino S., 4,088,811, Cl. 526-89.000.

B. B. and M. Inc.: *See—*
Moore, Emanuel M., 4,088,236, Cl. 214-90.00R.

B. F. Goodrich Company, The: *See—*
Herman, Richard Michael; and Batiuk, Martin, 4,088,713, Cl. 260-897.00A.
Riew, Changkiu Keith, 4,088,708, Cl. 260-836.000.

B. O. Morris Limited: *See—*
Dann, Robert Sidney, 4,088,418, Cl. 408-139.000.

Bacher, Rudolph John, to Du Pont de Nemours, E. I., and Company. Dielectric compositions of zirconates and/or aluminates and devices thereof. 4,089,038, Cl. 361-320.000.

Bachle, Walter W., to General Signal Corporation. Sealing ring with tabs for holding for assembly. 4,088,327, Cl. 277-11.000.

Bader, Leonhard, to NCR Corporation. Record media compensation means for printers. 4,088,215, Cl. 400-56.000.

Bafford, Richard Anthony: *See—*
Sheppard, Chester Stephen; MacLeay, Ronald Edward; and Bafford, Richard Anthony, 4,088,642, Cl. 260-174.000.

Baget, Jean; and Hucherot, Jean-Jacques, to Rhone-Poulenc Industries. 2-Phenyl-3-(4-hydroxycoumarin-3-yl)phthalimidine. 4,088,774, Cl. 424-274.000.

Baghdady, Elie J. Interference rejection technique. 4,088,955, Cl. 325-56.000.

Bagley, Thomas E.: *See—*
Callihan, Rudy B.; Bagley, Thomas E.; Warzecha, Alvin K.; and Vlasek, David J., 4,088,186, Cl. 166-241.000.

Bailey, Victor, to Bowater-Scott Corporation Limited. Dust extraction apparatus for use with paper and like machinery. 4,088,066, Cl. 98-115.00R.

Baker International Corporation: *See—*
Callihan, Rudy B.; Bagley, Thomas E.; Warzecha, Alvin K.; and Vlasek, David J., 4,088,186, Cl. 166-241.000.

Baker, Robert L., to Vapor Corporation. Electronic apparatus for positioning and using AC motors. 4,088,938, Cl. 318-561.000.

Balezin, Igor Nikolaevich: *See—*
Demin, Alexandr Viktorovich; Balezin, Igor Nikolaevich; Kosinsky, Konstantin Alexeevich; Serebrennikov, Vladimir Nikolaevich; Popov, Vadim Likarionovich; Shipkov, Nikolai Nikolaevich; and Dovguchits, Eduard Fedorovich, 4,088,503, Cl. 106-56.000.

Balmat, Jack S.; and Timm, Franklin E., to Bethlehem Steel Corporation. Wire handling apparatus. 4,088,160, Cl. 140-2.000.

Banka, Eugene F.; and Thompson, Roger F., to Burroughs Corporation. Credit card reader amplifier. 4,088,879, Cl. 235-449.000.

Banker, Robert O.; Brown, Charles T.; Ghaem-maghami, Sanjar; Holshouser, Howard E.; and Wachter, Kenneth J., to General Electric Company. VIR signal detector for a color television receiver. 4,089,025, Cl. 358-10.000.

Bannister, James Edward; and Connor, Ralph Fredrick, to Whirlpool Corporation. Discharge valve assembly for a compressor. 4,088,428, Cl. 418-270.000.

Barber, Ivan J., to Allen Group Inc., The. Drum towel drier for vehicles. 4,087,877, Cl. 15-97.00B.

Barbu, Cornelius: *See—*
Barna, Gheorghe; Stefan, Silviu; Suselescu, Mircea; Barbu, Cornelius; Chiose, Sergiu; Lebada, Ioan; and Negulescu, Florian, 4,089,056, Cl. 364-551.000.

Bargain, Michel; and Lefort, Marcel, to Rhone-Poulenc Industries. Ethylenic silicon compounds and thermoplastic elastomers obtained therefrom. 4,088,670, Cl. 260-448.20Q.

Barna, Gheorghe; Stefan, Silviu; Suselescu, Mircea; Barbu, Cornelius; Chiose, Sergiu; Lebada, Ioan; and Negulescu, Florian, to Institutul de Proiectari Tehnologice al Industriei Usoare; and Fabrica de Stofe de Mobila. Method and automated equipment for the tracking, control and synthesizing of manufacturing performance figures. 4,089,056, Cl. 364-551.000.

Barnes, Franklin K., to Boeing Company, The. Aircraft ramp assembly. 4,088,288, Cl. 244-137.00R.

Barnum, Thomas G.: *See—*
Doyle, Darrold E.; and Barnum, Thomas G., 4,088,297, Cl. 251-44.000.

Baron, David Alan, to Litton Systems, Inc. Combination microwave-thermal oven thermostat. 4,088,024, Cl. 73-343.00R.

Baron, Gerhard: *See—*
Kohlen, Rudolf; Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, 4,088,455, Cl. 48-202.000.

Barten, Piet Gerard Joseph, to U.S. Philips Corporation. Color television display device including a cathode-ray tube. 4,088,930, Cl. 315-370.000.

Barthlome, Donald E., to United States of America, National Aeronautics and Space Administration. Collapsible corrugated horn antenna. 4,089,004, Cl. 343-786.000.

Basdekas, Demetrios L.; Macrae, George; and Walsh, Joseph M., to United States of America, Energy. Temperature control system for a J-module heat exchanger. 4,088,182, Cl. 165-32.000.

Baserga, Emilio, to Sandoz Ltd. Cationic 1,4-diamino-anthraquinone dyestuffs. 4,088,661, Cl. 260-378.000.

BASF Aktiengesellschaft: *See—*
Baumann, Manfred; and Hoffmann, Werner, 4,088,681, Cl. 568-828.000.

Basmajian, Vahan V., to Megatech Corporation. Wind power demonstration apparatus. 4,087,927, Cl. 35-13.000.

Bates, Arthur Edward. Guide assembly for portable saws. 4,087,914, Cl. 30-374.000.

Bates, Jack A. Carpet cleaning machine. 4,087,881, Cl. 15-300.00A.

Batiuk, Martin: *See—*
Herman, Richard Michael; and Batiuk, Martin, 4,088,713, Cl. 260-897.00A.

Battelle Memorial Institute: *See—*
Schneider, Michel, 4,088,538, Cl. 195-63.000.

Baugh, Benton F., to Vetco Offshore Industries, Inc. Low friction electro-hydraulic pilot valve. 4,088,152, Cl. 137-625.650.

Baumann, Manfred; and Hoffmann, Werner, to BASF Aktiengesellschaft. Substituted 1-alkenynyl-cyclohexanols and -cyclohexenes and processes for their preparation. 4,088,681, Cl. 568-828.000.

Bausch & Lomb Incorporated: *See—*
Dey, Thomas W., 4,088,883, Cl. 362-263.000.

Baxter Travenol Laboratories, Inc.: *See—*
Byrne, Thomas D., 4,088,444, Cl. 21-56.000.
Miller, Joe A., 4,088,166, Cl. 150-.500.

Bayer Aktiengesellschaft: *See—*
Bohm, Siegfried; and Wedemeyer, Karlfried, 4,088,643, Cl. 260-192.000.
Findeisen, Kurt; Wagner, Kuno; Schafer, Walter; and Hennig, Hans Joachim, 4,088,665, Cl. 260-453.0AM.
Gomm, Walter; and Beecken, Hermann, 4,088,673, Cl. 260-465.00E.
Hofen, Willi; Prescher, Gunter; Siekmann, Gerd; and Wolf, Gunter, 4,088,676, Cl. 260-502.00R.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; and Hammann, Ingeborg, 4,088,758, Cl. 424-212.000.
Kalz, Dietmar; and Wolfrum, Gerhard, 4,088,651, Cl. 260-287.00H.
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,088,780, Cl. 424-300.000.
Prescher, Gunter; Weiberg, Otto; Waldmann, Helmut; and Seifert, Hermann, 4,088,679, Cl. 260-502.00R.
Roos, Ernst; Langner, Gunter; Kempermann, Theo; and Redetzky, Wolfgang, 4,088,630, Cl. 260-45.80A.
Uhrhan, Paul; Lantzsch, Reinhard; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,088,629, Cl. 260-45.80N.
Zecher, Wilfried; Dunwald, Willi; and Merten, Rudolf, 4,088,637, Cl. 260-77.5TB.

BBC Brown, Boveri & Company, Limited: *See—*
Kmetz, Allan R.; and Wild, Peter J., 4,088,992, Cl. 340-336.000.

BDH Pharmaceuticals Limited: *See—*
Hakim, Mehmood Abdulhameed; and Bysouth, Peter Thomas, 4,088,762, Cl. 424-250.000.

Beach, Marvin F.: *See—*
Jones, Robert E., 4,088,791, Cl. 426-99.000.

Beal, James B.: *See—*
Sukornick, Bernard; and Beal, James B., 4,088,517, Cl. 149-1.000.

Beard, Colin C.: *See—*
Roszkowski, Adolph P.; Beard, Colin C.; Dvorak, Charles; and Weinhardt, Klaus, 4,088,771, Cl. 424-273.00R.

Beck, Theodor; and Gross, Friedrich, to Plate Bonn Gesellshaft mit Beschrankter Haftung. Ensilaging agent for fodder plants. 4,088,789, Cl. 426-9.000.

Beecham Group Limited: *See—*
Howarth, Thomas Trefor; and Stirling, Irene, 4,088,656, Cl. 260-307.0FA.

Beecken, Hermann: *See—*
Gomm, Walter; and Beecken, Hermann, 4,088,673, Cl. 260-465.00E.

Beekenkamp, Gerald: *See—*
Norton, Ian F.; and Beekenkamp, Gerald, 4,088,335, Cl. 280-11.180.

Beemer, Terry Wayne: *See—*
Jewett, James Wilson; and Beemer, Terry Wayne, 4,088,372, Cl. 301-63.00R.

Beiersdorf Aktiengesellschaft: *See—*
Petersen, Rudolf, 4,088,757, Cl. 424-182.000.

Bell, Lon E., to Technar, Inc. Thermally operated bimetal actuator. 4,088,976, Cl. 337-107.000.

Bell Telephone Laboratories, Incorporated: *See—*
Kinnaird, Richard Clyde, Jr., 4,088,844, Cl. 179-99.000.
Lee, James Patrick, Jr.; Raffa, Joseph Anthony; Sansone, Frank Peter; and Stochel, Nathan Harold, 4,089,051, Cl. 364-200.000.
McEowen, James Royce, 4,088,846, Cl. 179-99.000.
Miedema, Hotze, 4,088,948, Cl. 324-57.00R.
Yiannoulos, Aristides Antony, 4,087,900, Cl. 29-578.000.

Bellus, Daniel: *See—*
Felder, Louis; Kirchmayr, Rudolf; and Bellus, Daniel, 4,088,554, Cl. 204-159.150.

Bendix Corporation, The: *See—*
Kerr, Leo A.; Sinsky, Allen I.; and Gonsalves, Richard, 4,089,002, Cl. 343-11.00R.

Benedict, John P. Material cutting apparatus. 4,088,049, Cl. 83-240.000.

Bennett, Joseph C.: *See—*
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,087,908, Cl. 29-753.000.

Bennett, Robert A. Manually operated pump for disposable container. 4,088,425, Cl. 417-444.000.

Bennington, Robert L.; and Massengale, John T., to FMC Corporation. Process for making high moisture barrier polyvinyl chloride film. 4,088,725, Cl. 264-95.000.

Benseman, Roy Fergus, to Development Finance Corporation. Heat exchanger. 4,088,118, Cl. 126-271.000.

Benson, Harvey D.; and Blohm, Thomas R., to Richardson-Merrell Inc. Testosterone 5α-reductase inhibitors. 4,088,760, Cl. 424-242.000.

Benthin, Johannes, to MFB Neuwerk Mechanische Fensterbehaenge GmbH. Ventilated toilet. 4,087,871, Cl. 4-217.000.

Bentivegna, Charles R.: *See—*
Heisner, Donald N.; and Bentivegna, Charles R., 4,088,936, Cl. 318-626.000.

Bentley, Terence James: *See—*
Asato, Goro; and Bentley, Terence James, 4,088,786, Cl. 424-322.000.

Beremand, Donald G.; Shure, Lloyd I.; and Mroz, Thaddeus S., to United States of America, National Aeronautics and Space Administration. Direct heating surface combustor. 4,087,962, Cl. 60-39.650.

Berger, Christian; Farge, Daniel; and Moutonnier, Claude, to Rhone-Poulenc Industries. 3-[(1,3-Dithiin-5-yl)-acetamido]-cephalosporins and antibacterial compositions containing them. 4,088,761, Cl. 424-246.000.

Berger, Philip H. Personnel cable transport safety system. 4,088,988, Cl. 340-267.00R.

Berger, Pierre; de Choudens, Christian; Lombardo, Gerard; and Monzie, Pierre. Method and apparatus for grinding chips into paper pulp. 4,088,528, Cl. 162-19.000.

Berleue, Albert J.; and Dumbaugh, William H., Jr., to Corning Glass Works. Liquid level gauge. 4,088,023, Cl. 73-334.000.

Bernstein, Philip; and Coffey, James P., to ESB Incorporated. Atactic polypropylene tape. 4,088,628, Cl. 260-42.460.

Berntsen, Peter; and Peterson, Phillip R. Driven-type survey monument. 4,087,945, Cl. 52-103.000.

Bertrand, Olivier Philippe, to Brigolle, Roger. Amplitude and frequency adjustable vibration generator. 4,088,223, Cl. 198-761.000.

Berwald, Ernst; and Asbeck, Volker, to Schering Aktiengesellschaft. Frame container for pressure vessels. 4,088,238, Cl. 220-1.500.

Bethlehem Steel Corporation: *See—*
Balmat, Jack S.; and Timm, Franklin E., 4,088,160, Cl. 140-2.000.
Gingher, George C., Jr., 4,088,308, Cl. 266-90.000.

Bettencourt, Thomas S., to University of California, The Regents of the. Tomato harvester separator. 4,088,570, Cl. 209-396.000.

Betz Laboratories, Inc.: *See—*
Tonkyn, Richard G.; and Vorchheimer, Norman, 4,088,613, Cl. 260-2.0BP.

Bevan, David William; Clarke, Michael Willam; Haisman, Derek Robin; and Pendlington, Sydney, to Lever Brothers Company. Reducing reconstitution time of dehydrated vegetables with phytate. 4,088,790, Cl. 426-96.000.

Bevan, Geoffrey; and Carter, Peter, to Lever Brothers Company. Detergent compositions. 4,088,610, Cl. 252-541.000.

Bezsilko, Nicolas, to S.A. Vandeputte Fils & Cie. Apparatus for feeding and orienting coins. 4,088,143, Cl. 133-1.00R.

Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., to Canada Packers Limited. Control of nitrosamine formation in nitrite cured meat. 4,088,793, Cl. 426-266.000.

Bhat, Sujata Vasudev; de Souza, Noel John; Dornauer, Horst; Bhattacharya, Bani Kanta; and Dohadwalla, Alihusein Nomanbhai, to Hoechst Aktiengesellschaft. Effective substance from plants belonging to the labiatae family. 4,088,659, Cl. 260-345.200.

Bhat, Vasanth K.; Siegel, Allen E.; Vogel, Richard E.; and Burrows, Larry G., to Emerson Electric Co. Glow plug. 4,088,105, Cl. 123-145.00A.

Bhatnagar, Vijaya K.: *See—*
Gupta, Shanti S.; Bhatnagar, Vijaya K.; and Litster, John F., 4,088,851, Cl. 179-170.200.

Bhattacharya, Bani Kanta: *See—*
Bhat, Sujata Vasudev; de Souza, Noel John; Dornauer, Horst; Bhattacharya, Bani Kanta; and Dohadwalla, Alihusein Nomanbhai, 4,088,659, Cl. 260-345.200.

Bhattacharyya, Asita; Dormoy, Michel Jean-Claude; and Richard, Gerard Yves, to Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C. Self-hardening molding compositions. 4,088,624, Cl. 260-38.000.

Biancardi, Frank R.: *See—*
Peters, George T.; Melikian, Gorken; and Biancardi, Frank R., 4,088,865, Cl. 219-121.00L.

Bianchetta, Donald L., to Caterpillar Tractor Co. Flow control valve for combining two dissimilar independent systems to a common pressure source. 4,087,968, Cl. 60-445.000.

Bienek, Artur. Hand drier. 4,087,925, Cl. 34-60.000.

Bierbach, Herbert: *See—*
Kohlen, Rudolf; Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, 4,088,455, Cl. 48-202.000.

Bifulco, John M. Knee holder for golfers. 4,088,326, Cl. 273-188.00R.

Bigi, Emanuele, to S.I.A.D. Societa Italiana Acetilene E Derivati. Method and apparatus with a single rectifying column for air fractionation. 4,088,464, Cl. 62-22.000.

Bijkerk, Egbertus Nicolaas: *See—*
Potma, Theodorus Gerhardus; Bijkerk, Egbertus Nicolaas; and Quirijnen, Marius, 4,088,256, Cl. 226-74.000.

Billeruds Aktiebolag: *See—*
Ryhman, Jens Olov; and Vogt, Nils Anton, 4,088,529, Cl. 162-65.000.

Billings Energy Corporation: *See—*
Simons, Harold Martell, 4,088,176, Cl. 164-66.000.

Billsund, Enok Gerhard. Toilet in which solid wastes are collected and decomposed. 4,087,869, Cl. 4-111.000.

Binns, Keith, to Dunlop Limited. Passenger conveyors. 4,088,219, Cl. 198-323.000.

Bio-Rad Laboratories, Inc.: *See—*
Blakemore, Judith I.; Lewin, Nathan; and Burgett, Michael W., 4,088,746, Cl. 424-1.000.

Bissonette, Vernon L., to Eastman Kodak Company. Process of bleaching silver images to form dye images using cobalt complexes and peroxides. 4,088,486, Cl. 96-22.000.

Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Method of inhibiting histamine activity with guanidine compounds. 4,088,769, Cl. 424-270.000.

Blackman, R. Eugene: *See—*
Laule, Thomas M.; and Blackman, R. Eugene, 4,088,462, Cl. 55-437.000.

Blake, William S. Sprayer-dispenser pumps. 4,088,248, Cl. 222-207.000.

Blakemore, Judith I.; Lewin, Nathan; and Burgett, Michael W., to Bio-Rad Laboratories, Inc. Radioimmunoassay for thyroid-stimulating hormone (TSH). 4,088,746, Cl. 424-1:000.

Blakeslee, A. Eugene; and Matthews, John Wauchope, to International Business Machines Corporation. Method of making semiconductor superlattices free of misfit dislocations. 4,088,515, Cl. 148-175.000.

Blanc, Claude-Alain: *See—*
Hugelin, Bernard; Blanc, Claude-Alain; and Serex, Charles, 4,088,442, Cl. 8-2.50A.

Blanchfield, Richard J.: *See—*
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, 4,088,551, Cl. 204-129.000.

Blaze, Joseph E., Jr., to McDanel Refractory Porcelain Company. Thermocouple protection tubes. 4,088,509, Cl. 136-235.000.

Blohm, Thomas R.: *See—*
Benson, Harvey D.; and Blohm, Thomas R., 4,088,760, Cl. 424-242.000.

Blok, Arie. Microwave drying apparatus. 4,087,921, Cl. 34-1.000.

Blomgren, Gerth Karl Anders: *See—*
Karlsson, Jarding Urban; and Blomgren, Gerth Karl Anders, 4,088,279, Cl. 242-84.10R.

Bloom, Stanley M.; and Rogers, Howard G., to Polaroid Corporation. Diffusion transfer integral film units with flare reducing layers. 4,088,487, Cl. 96-29.00D.

Blount, David H. Process for the production of acrylate silicate compounds and resinous products. 4,088,632, Cl. 260-46.50R.

Blue, James W., to United States of America, National Aeronautics and Space Administration. Targets for producing high purity ^{123}I. 4,088,532, Cl. 176-11.000.

Bluzer, Nathan: *See—*
Wu, Shu-Yau; Bluzer, Nathan; Francombe, Maurice H.; and Jensen, Arthur S., 4,088,546, Cl. 204-15.000.

Bodem, Roy C., to General Motors Corporation. Windshield wiper drive mechanism with depressed parking. 4,088,035, Cl. 74-70.000.

Bodenseewerk Perkin-Elmer & Co., GmbH: *See—*
Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, 4,088,446, Cl. 23-230.00R.

Bodine, Kenneth E.; and McDowell, Verle A. Gasoline engine piston position tester. 4,088,011, Cl. 73-116.000.

Bodor, Nicolae S.; and Yuan, Sun-Shine, to INTERx Research Corporation. Novel optically active m-acylocy-α-[(methylamino)methyl]-benzyl alcohols and the pharmaceutically acceptable acid addition salts thereof. 4,088,783, Cl. 424-313.000.

Boehringer Mannheim GmbH: *See—*
Woog, Heinrich; Gruber, Werner; and Rothe, Werner, 4,088,759, Cl. 424-240.000.

Boeing Company, The: *See—*
Barnes, Franklin K., 4,088,288, Cl. 244-137.00R.
Bolang, Per Axel; and Dawson, Alan Bartholomew Cairns, 4,088,039, Cl. 74-479.000.
Desjardins, Rene A.; Ellis, Charles W.; and Sankewitsch, Vladimir, 4,088,042, Cl. 74-574.000.
Paulsen, Donald E., 4,089,040, Cl. 361-383.000.

Bogachenko, Alexei Georgievich: *See—*
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.

Bohm, Siegfried; and Wedemeyer, Karlfried, to Bayer Aktiengesellschaft. Process for the production of azodicarbonamide. 4,088,643, Cl. 260-192.000.

Bohn, F. Lewis: *See—*
Yeh, Chuen Y.; Bohn, F. Lewis; and Ulmer, Harry E., 4,088,703, Cl. 568-835.000.

Boileau, Jacques; and Mathevet, Albert, to Compagnie Generale des Etablissements Michelin. Tire having concave shoulders. 4,088,168, Cl. 152-352.00R.

Bolang, Per Axel; and Dawson, Alan Bartholomew Cairns, to Boeing Company, The. Ratio changing mechanism. 4,088,039, Cl. 74-479.000.

Bolex International SA: *See—*
Etter, Walter, 4,088,283, Cl. 242-197.000.

Bolin, Philip C., to Westinghouse Electric Corp. Gas-insulated electrical apparatus with field-installable particle traps. 4,088,826, Cl. 174-14.00R.

Bolon, Donald A.; Lucas, Gary M.; and Schroeter, Siegfried H., to General Electric Company. U.V. Radiation curable electrically conductive ink and circuit boards made therewith. 4,088,801, Cl. 427-54.000.

Bonistalli, Raymond J., to Obenchain Corporation. Electric furnace station noise and smoke pollution control system. 4,088,824, Cl. 13-9.00R.

Booth, Robin G.: *See—*
Cooper, Anthony R.; Booth, Robin G.; and Matzinger, David P., 4,088,572, Cl. 210-23.00F.

Borden Products Limited: *See—*
Chan, Lock-Lim; and Schaffer, Joseph Francis, 4,088,530, Cl. 162-168.0NA.

Borg-Warner Corporation: *See—*
Albertson, Clarence E., 4,088,547, Cl. 204-32.00R.
Brown, William Lee, 4,088,212, Cl. 192-106.200.
Schurger, Joseph Anthony, 4,088,151, Cl. 137-596.200.
Tuzson, John Janos, 4,088,459, Cl. 55-203.000.
Wargin, Robert V.; and Boyd, Clinton A., 4,088,830, Cl. 174-113.00R.

Borst, Wolfgang; and Ott, Karl, to Robert Bosch GmbH. Quiescent current disconnect system and apparatus for ignition coils of internal combustion engine ignition system. 4,088,106, Cl. 123-146.50D.

Bossi, Gianfranco; and Rogora, Edoardo, to Alfa Romeo S.p.A. Internal combustion engine comprising an exhaust system provided with probes for exhaust gas analysis. 4,088,096, Cl. 123-32.0EE.

Boucher, Charles E. Smoke, fire and gas alarm with remote sensing,

back-up emergency power, and system self monitoring. 4,088,986, Cl. 340-237.00S.

Bourg, Andre; Hazart, Jean P. M.; and Jouret, Jacques Y., to Corning Glass Works. Process of heat sagging glass articles. 4,088,470, Cl. 65-105.000.

Bowater-Scott Corporation Limited: *See*—
Bailey, Victor, 4,088,066, Cl. 98-115.00R.

Bowen, Leon O., Jr.; and McVean, Michael T., to Rangaire Corporation. Venting and recirculating vent kitchen hood. 4,088,123, Cl. 126-299.00D.

Bowman, Joseph Henry, Jr.; Eikelberger, Rand Jeffery; and Miller, Arnold M., to Illinois Tool Works Inc. Contactless linear position sensor. 4,088,977, Cl. 338-32.00R.

Bowser, Robert E., to Simplimatic Engineering Co. Stop apparatus for palletizers and the like. 4,088,221, Cl. 198-491.000.

Boyd, Clinton A.: *See*—
Wargin, Robert V.; and Boyd, Clinton A., 4,088,830, Cl. 174-113.00R.

Bracco, Umberto, to Societe d'Assistance Technique pour Produits Nestle SA (Nestec). Low calorie dessert. 4,088,792, Cl. 426-250.000.

Bradford, William C., to United States of America, Navy. High altitude pulse doppler fuze. 4,089,000, Cl. 343-7.0PF.

Bradley Corporation: *See*—
Doyle, Darrold E.; and Barnum, Thomas G., 4,088,297, Cl. 251-44.000.
Williams, Frank N., 4,088,302, Cl. 251-361.000.

Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, to Robert Bosch GmbH. Ignition distributor-breaker structure for internal combustion engines. 4,088,853, Cl. 200-19.00R.

Bratzler, Karl; Doerges, Alexander; Hochgesand, Gerhard; and Kriebel, Manfred, to Metallgesellschaft Aktiengesellschaft. Process for purifying gases from the gasification of fossil fuels. 4,088,735, Cl. 423-219.000.

Brauer, Lothar W., to Auergesellschaft GmbH. Combination of a supplementary filter and respirator filter. 4,088,461, Cl. 55-275.000.

Brautigam, Hans: *See*—
Weidenbach, Guenther; Koepernik, Karl Hermann; and Brautigam, Hans, 4,088,607, Cl. 252-466.0PT.

Breckenridge, Roger A.: *See*—
United States of America, National Aeronautics and Space Administration; Debnam, William J., Jr.; Fales, Carl L., Jr.; Breckenridge, Roger A.; and Pohm, Arthur V., 4,088,954, Cl. 324-249.000.

Breslau, Steven M.; Grossman, Morris Gary; and Levy, Edward D., to Falcon Safety Products, Inc. Drying apparatus for photo prints and the like. 4,087,926, Cl. 34-70.000.

Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 3-Heterothio-7-ureido cephalosporins. 4,088,815, Cl. 544-26.000.

Breuer, Hermann: *See*—
Treuner, Uwe D.; and Breuer, Hermann, 4,088,816, Cl. 544-27.000.

Brewer, Norman L.: *See*—
Watts, Leonard R.; and Brewer, Norman L., 4,088,565, Cl. 208-33.000.

Bridgestone Tire Company Limited: *See*—
Kuroda, Masahiro, 4,088,169, Cl. 152-362.00R.

Brigolle, Roger: *See*—
Bertrand, Olivier Philippe, 4,088,223, Cl. 198-761.000.

Briles, Paul R.: *See*—
Salter, Larry, 4,087,896, Cl. 29-256.000.

Brinton, Michael Brian Jervis, to RNLI (Trading) Limited. Engine water-tighting devices. 4,088,090, Cl. 115-17.000.

British American Tobacco Co., Ltd.: *See*—
Horsewell, Henry George; and Crellin, Robin Arthur, 4,088,142, Cl. 131-9.000.

British Steel Corporation: *See*—
Dyer, David; and Wilmshurst, Trevor H., 4,089,055, Cl. 364-551.000.
Furness, Bernard J., 4,088,409, Cl. 356-153.000.

Brock, Joe F. Tennis racket attachment. 4,088,320, Cl. 273-73.00R.

Brook, Roger Frederick; and Hein, Paul William, to General Electric Company. Gantry for computed tomography. 4,088,888, Cl. 250-445.00T.

Brown, Charles T.: *See*—
Banker, Robert O.; Brown, Charles T.; Ghaem-maghami, Sanjar; Holshouser, Howard E.; and Wachter, Kenneth J., 4,089,025, Cl. 358-10.000.

Brown, Cicero C., deceased (by Brown, Joe Russell, executor); and Brown, Ramey Lee, executor, to Brown Oil Tools, Inc. Check valve assembly. 4,088,298, Cl. 251-149.800.

Brown, Edgar D., Jr.; and Traver, Frank J., to General Electric Company. Silicone fluid useful as a brake fluid. 4,088,591, Cl. 252-75.000.

Brown, Harvey A.; and Reece, Jack E., to Minnesota Mining and Manufacturing Company. Acutance agents for use in thermally-developable photosensitive compositions. 4,088,497, Cl. 96-114.100.

Brown, Joe Russell, executor: *See*—
Brown, Cicero C., deceased; and Brown, Ramey Lee, executor, 4,088,298, Cl. 251-149.800.

Brown, Leonard. Pesticide dispenser with calibrated tubular outlet probe. 4,088,245, Cl. 222-41.000.

Brown Oil Tools, Inc.: *See*—
Brown, Cicero C., deceased; and Brown, Ramey Lee, executor, 4,088,298, Cl. 251-149.800.

Brown, Peter John Raymond, to Piper F.M. Limited. Atomizing device. 4,088,103, Cl. 123-141.000.

Brown, Ramey Lee, executor: *See*—
Brown, Cicero C., deceased; and Brown, Ramey Lee, executor, 4,088,298, Cl. 251-149.800.

Brown, William L., to SI Handling Systems, Inc. Storage and retrieval system. 4,088,237, Cl. 214-152.000.

Brown, William Lee, to Borg-Warner Corporation. One piece stamped clutch hub. 4,088,212, Cl. 192-106.200.

Browne, Anthony Arthur Briarly; and McIntyre, James Eric, to Imperial Chemical Industries Limited. Polyester manufacture. 4,088,635, Cl. 260-78.410.

Bruggemann, Hans; and Heilemann, Otto, to Daimler-Benz Aktiengesellschaft. Sealing arrangement. 4,088,347, Cl. 285-24.000.

Brugger, Marcel: *See*—
Chen, Yian Nian; Brugger, Marcel; Maurer, Friedrich; and Meyer, Alfred, 4,088,157, Cl. 139-1.00R.

Brunnert, Otto: *See*—
Martin, Erwin; Hoffmann, Helmut; and Brunnert, Otto, 4,088,917, Cl. 310-357.000.

Brunswick Corporation: *See*—
Hager, James R., 4,088,108, Cl. 123-148.0CC.

Brust, David Philip; Chen, Tsang Jan; Ponticello, Ignazio Salvatore; and Pierce, Zona Reynolds, to Eastman Kodak Company. Selectively permeable layers for diffusion transfer film units. 4,088,499, Cl. 96-29.00D.

Buchanan, Donald George; and Jones, Roderick Frank, to Strathearn Audio Limited. Channel coupling. 4,088,902, Cl. 307-241.000.

Buchanan, Richard S., Jr. Contact lens inserter. 4,088,359, Cl. 294-1.0CA.

Bucknam, Ralph E. Typewriter attachment. 4,088,217, Cl. 400-161.100.

Buehrle, Victor E.: *See*—
Taylor, Don A.; and Buehrle, Victor E., 4,088,524, Cl. 156-129.000.

Buess, Paul Lawrence: *See*—
Pradal, Bortolo Mario; and Buess, Paul Lawrence, 4,088,968, Cl. 332-26.000.

Buldini, Daniel A., to Polaroid Corporation. Automatic photostudio. 4,089,017, Cl. 354-81.000.

Bull, Dale L.; and Rautiola, Norman A., to Nartron Corporation. Lens structure. 4,089,048, Cl. 362-338.000.

Bunas, Bennie I., to UOP Inc. Solvent deasphalting apparatus. 4,088,540, Cl. 196-14.520.

Bundy, Gordon L., to Upjohn Company, The. 3,7-Inter-m-phenylene-13,14-dihydro-9-deoxy-PGF compounds. 4,088,819, Cl. 560-61.000.

Bunker Ramo Corporation: *See*—
Frey, Laverne Lawrence, 4,088,910, Cl. 310-89.000.
Harnett, Herbert Martin, 4,088,381, Cl. 339-94.00A.

Burcher, Ernest E.; Katzberg, Stephen J.; and Kelly, William L., IV, to United States of America, National Aeronautics and Space Administration. Device for measuring the contour of a surface. 4,088,408, Cl. 356-120.000.

Burgett, Michael W.: *See*—
Blakemore, Judith I.; Lewin, Nathan; and Burgett, Michael W., 4,088,746, Cl. 424-1.000.

Burkholder, Ward J.: *See*—
Anderson, John E.; and Burkholder, Ward J., 4,088,699, Cl. 260-610.00B.

Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. O,O-Dialkylphosphoryloxy-2,3,5,8-tetrahydro-1H-s-triazolo[1,2a]pyridazine-1,3-diones. 4,088,645, Cl. 544-232.000.

Burroughs Corporation: *See*—
Banka, Eugene F.; and Thompson, Roger F., 4,088,879, Cl. 235-449.000.
Haas, Frank J., 4,088,982, Cl. 340-146.3ED.
Rege, Satish Laxmanrao, 4,088,876, Cl. 235-312.000.

Burroughs Wellcome Co.: *See*—
Cresswell, Ronald M.; and Holstius, Elvin A., 4,088,750, Cl. 424-37.000.

Burrows, Larry G.: *See*—
Bhat, Vasanth K.; Siegel, Allen E.; Vogel, Richard E.; and Burrows, Larry G., 4,088,105, Cl. 123-145.00A.

Butcher, John A. W.; and Lambourn, Edward H., to International Standard Electric Corporation. Synchronization for PCM transmission systems. 4,088,831, Cl. 178-69.100.

Butler, Gene R.: *See*—
Zipser, Randall E.; Butler, Gene R.; and Grey, Donald M., 4,088,231, Cl. 214-6.00B.

Byrne, Thomas D., to Baxter Travenol Laboratories, Inc. Process and apparatus for sterilizing containers. 4,088,444, Cl. 21-56.000.

Bysouth, Peter Thomas: *See*—
Hakim, Mehmood Abdulhameed; and Bysouth, Peter Thomas, 4,088,762, Cl. 424-250.000.

C. van der Lely N.V.: *See*—
Dail, John P., Jr.; and van den Berg, Pieter, 4,088,083, Cl. 111-13.000.

Callahan, William A.; Glenn, Eldridge Myles; and Rector, Douglas L., to Upjohn Company, The. Urea containing compositions and methods. 4,088,766, Cl. 424-263.000.

Callaway, Lee Weller; and Callaway, Michael Arthur. Infant carrier bag with movable filler beneath pillow. 4,087,874, Cl. 5-343.000.

Callaway, Michael Arthur: *See*—
Callaway, Lee Weller; and Callaway, Michael Arthur, 4,087,874, Cl. 5-343.000.

Callihan, Rudy B.; Bagley, Thomas E.; Warzecha, Alvin K.; and Vlasek, David J., to Baker International Corporation. Centering device for well conduit. 4,088,186, Cl. 166-241.000.

Calvin, Douglas G.: *See—*
Howard, Curtis E.; and Calvin, Douglas G., 4,088,187, Cl. 166-264.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of Defence: *See—*
Dallaire, Jean Guy, 4,088,056, Cl. 89-1.700.

Canada Packers Limited: *See—*
Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., 4,088,793, Cl. 426-266.000.

Canadair Limited: *See—*
Huvers, Marius E., 4,087,919, Cl. 33-301.000.

Canadian General Electric Company Limited: *See—*
Szymanis, Edward, 4,087,955, Cl. 56-202.000.

Canadian Patents and Developments Limited: *See—*
Knaus, Edward E.; Redda, Kinfe; and Wandelmaier, Frank Wilhelm, 4,088,653, Cl. 260-295.0AM.

Cannon, William P. Music stand lamp. 4,089,046, Cl. 362-99.000.

Canon Kabushiki Kaisha: *See—*
Aoki, Kanemasa, 4,088,914, Cl. 310-264.000.
Date, Nobuaki; Watanabe, Yoshiaki; Sunouchi, Akio; Mashimo, Yukio; Ito, Fumio; and Ito, Tadashi, 4,089,011, Cl. 354-23.00D.
Ito, Tadashi; Sakurada, Nobuaki; Kawamura, Masaharu; Shinoda, Nobuhiko; Ito, Fumio; and Murakami, Hiroyashu, 4,089,010, Cl. 354-23.00D.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,088,872, Cl. 235-91.00R.

Canon Seiki Kabushiki Kaisha: *See—*
Aoki, Kanemasa, 4,088,914, Cl. 310-264.000.

Canron, Inc.: *See—*
von Beckmann, Helmuth, 4,088,077, Cl. 104-12.000.

Caprini, Joseph A.: *See—*
Mazzariello, Rodolpho M., 4,088,134, Cl. 128-321.000.

Cardiac Resuscitator Corp.: *See—*
Diack, Archibald W.; Welborn, Warren S.; and Rullman, Robert G., 4,088,138, Cl. 128-419.00D.

Carey, Ronald David: *See—*
Sandner, Michael Ray; Rosemund, Walter Richard; and Carey, Ronald David, 4,088,615, Cl. 260-2.5AM.

Carl Still Recklinghausen, Firma: *See—*
Knappstein, Johannes; and Strobel, Manfred, 4,088,233, Cl. 214-23.000.

Carle, Jean-Claude Alfred, to Societe anonyme des Fonderies et Ateliers L. Choquenet. Device for the continuous filtration under pressure of solid materials contained in liquids. 4,088,581, Cl. 210-391.000.

Carlson, Emery John: *See—*
Pieters, Wim Johan Meindert; Gates, William Ellis; Carlson, Emery John; and Wilkalis, John Edward, 4,088,705, Cl. 260-653.700.

Carondelet Foundry Company: *See—*
Culling, John H., 4,088,478, Cl. 75-134.00C.

Carpenter Technology Corporation: *See—*
Karpen, William L., 4,088,585, Cl. 252-28.000.

Carr, Thomas M., to Lunney, Philip. Transmission system. 4,088,037, Cl. 74-371.000.

Carr, Victor H., to General Electric Company. Electric furnace wall construction. 4,088,825, Cl. 13-25.000.

Carson, Forrest Leon, to J. M. Huber Corporation. Molded plastic paraffin scrapers and centralizers. 4,088,185, Cl. 166-176.000.

Carter, James L.; and Sinfelt, John H., to Exxon Research & Engineering Co. Catalyst activation process. 4,088,603, Cl. 252-454.000.

Carter, Malcolm Nigel Alan; McGhee, Brian; Helliwell, John Fielden; Marshall, John Kerr; and Naik, Appayya Raghunath, to Lever Brothers Company. Detergent compositions. 4,088,612, Cl. 252-545.000.

Carter, Peter: *See—*
Bevan, Geoffrey; and Carter, Peter, 4,088,610, Cl. 252-541.000.

Casara, Patrick J.; Jung, Michel; and Metcalf, Brian Walter, to Merrell Toraude et Compagnie. Lower alkyl 2-tri-(lower)alkylsilylacetylene-N-carbethoxyglycinates and process for using same. 4,088,667, Cl. 260-448.20N.

Caspers, Hubert H.: *See—*
Rast, Howard E.; and Caspers, Hubert H., 4,088,884, Cl. 250-199.000.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,088,764, Cl. 424-251.000.

Castcraft Industries, Inc.: *See—*
Frazier, Clifford John, 4,089,009, Cl. 354-15.000.

Castek, Charles Henri: *See—*
Rossignol de la Ronde, Raymond Rene; and Castek, Charles Henri, 4,088,413, Cl. 401-282.000.

Castet, Andre, to L'Electronique Appliquee. Electronic cross-point matrix telephone private switching equipment. 4,088,840, Cl. 179-18.0GF.

Castrodale, Daniel Owen; Pendy, William John, Jr.; and Wentink, William Stewart, to International Business Machines Corporation. Data storage apparatus using a flexible magnetic disk. 4,089,029, Cl. 360-99.000.

Caswell, Berwyn B., to Textron, Inc. Phasing control for convertiplane. 4,088,284, Cl. 244-7.00R.

Caterpillar Tractor Co.: *See—*
Bianchetta, Donald L., 4,087,968, Cl. 60-445.000.
Corrigan, Ara L., 4,088,377, Cl. 305-10.000.
Helton, Eugene L.; and Simmons, Gerald P., 4,088,429, Cl. 425-8.000.
Johnson, Lowell E.; Ireland, Gerald B.; and Schneider, Marvin L., 4,088,043, Cl. 74-681.000.
McCoige, Bruce K., 4,088,857, Cl. 200-61.880.
Wineburner, Ronald E.; and Allen, Norman R., 4,088,305, Cl. 254-187.500.

Caton, Michael Peter Lear; Coffee, Edward Charles John; and Watkins, Gordon Leonard, to May & Baker Limited. Cyclopentanone derivatives. 4,088,695, Cl. 260-590.00C.

Caton, Michael Peter Lear; and Parker, Trevor, to May & Baker Limited. Cyclopentane derivatives. 4,088,821, Cl. 560-121.000.

Cavallaro, Leonardo, to General Atomic Company. Tube support and protection system for helical coil heat exchangers. 4,088,184, Cl. 165-162.000.

Ceagfilter und Entstaubungstechnik GmbH: *See—*
Winter, Karl, 4,088,460, Cl. 55-208.000.

Cecere, Anthony, to Pertot, Alfred G. Vacuum-fed centrifugal casting machine. 4,088,175, Cl. 164-63.000.

Celanese Corporation: *See—*
Lamond, Lee, 4,088,192, Cl. 169-19.000.

Cesenek, Bedrich: *See—*
Vlcek, Karel; Pacakova, Zdena; Jirka, Bohuslav; Cesenek, Bedrich; and Jindra, Karel, 4,088,226, Cl. 209-82.000.

Cestone, Frank J.: *See—*
Ollendorf, Joel; and Cestone, Frank J., 4,088,406, Cl. 355-132.000.

Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Optically active amides and process for producing the same. 4,088,662, Cl. 260-404.000.

Chan, Lock-Lim; and Schaffer, Joseph Francis, to Borden Products Limited. Dry strength paper and process therefor. 4,088,530, Cl. 162-168.0NA.

Chang, Jack C.; Marr, Peter A.; and Ciurca, Samuel J., Jr., to Eastman Kodak Company. Photographic elements containing nitroxyl radical oxidants. 4,088,488, Cl. 96-29.00D.

Chapel, Lesley. Foot-wearable stilt. 4,088,336, Cl. 280-11.190.

Charles, Robert G.; and Lindsay, William T., Jr., to Westinghouse Electric Corp. Magnetic bridge transducer formed with permanent magnets and a hall effect sensor for identifying the presence and location of ferromagnetic discontinuities within or on a tubular specimen. 4,088,946, Cl. 324-220.000.

Chase, Russell C. Internal expanding collet clamp. 4,088,332, Cl. 279-2.00R.

Chateau, Louis Jean, to Ducellier et Cie. Electronic ignition control device for a motor vehicle. 4,088,107, Cl. 123-148.00E.

Chemed Corporation: *See—*
Tutein, Thomas R.; Harrington, Anne E.; and Jacob, Jose T., 4,088,600, Cl. 252-344.000.

Chen, Tsang Jan: *See—*
Brust, David Philip; Chen, Tsang Jan; Ponticello, Ignazio Salvatore; and Pierce, Zona Reynolds, 4,088,499, Cl. 96-29.00D.

Chen, Yian Nian; Brugger, Marcel; Maurer, Friedrich; and Meyer, Alfred, to Sulzer Brothers Ltd. Hood system for covering an automatically operating machine. 4,088,157, Cl. 139-1.00R.

Chernykh, Vitaly Petrovich. Rotary shaft end seal for apparatus operating under pressure. 4,088,330, Cl. 277-59.000.

Chevalier, Claude; Le Diouron, Raymond; Schoutteten, Christian; Le Floch, Daniel; and Le Bot, Jean-Pierre, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Production of metal castings. 4,087,899, Cl. 29-527.600.

Chevron Research Company: *See—*
Hutchison, Stanley O., 4,088,191, Cl. 166-223.000.
Lowe, Warren, 4,088,587, Cl. 252-32.70E.
White, Robert J., 4,088,567, Cl. 208-113.000.
Wilgus, Donovan R.; and King, John M., 4,088,586, Cl. 252-51.50R.
Woo, Gar Lok, 4,088,680, Cl. 260-512.00R.

Chida, Atushi: *See—*
Kosaka, Katuaki; Ueno, Zene; Ishikura, Seizo; and Chida, Atushi, 4,088,450, Cl. 23-288.00L.

Chiose, Sergiu: *See—*
Barna, Gheorghe; Stefan, Silviu; Suselescu, Mircea; Barbu, Cornelius; Chiose, Sergiu; Lebada, Ioan; and Negulescu, Florian, 4,089,056, Cl. 364-551.000.

Chiu, Thomas T.: *See—*
Czerepinski, Ralph G.; Hecht, Jeffrey K.; and Chiu, Thomas T., 4,088,482, Cl. 96-1.50R.

Choi, Charles K.; Gundzik, Richard M.; and Tassoney, Joseph P., to Occidental Petroleum Corporation. Apparatus for pyrolyzing organic solid waste. 4,088,541, Cl. 202-99.000.

Choyce, D. Peter; and Jalie, Mohammed, to Coburn Optical Industries, Inc. Intraocular lens. 4,087,866, Cl. 3-13.000.

Christiana Metals Corporation: *See—*
Devine, Janet, 4,088,257, Cl. 228-110.000.

Christidis, Yani; and Schouteeten, Alain, to Nobel Hoechst Chimie. Process for manufacturing N-acyl derivatives of glycines α-substituted by radicals of aromatic nature and novel products thereof. 4,088,657, Cl. 260-332.20A.

Chrysler Corporation: *See—*
Hall, John F.; MacDonald, Donald C.; and Holliday, Frank R., 4,088,241, Cl. 220-86.00R.

Chuo Spring Co., Ltd.: *See—*
Kubo, Shinsuke; and Kuzunishi, Hiroyuki, 4,088,156, Cl. 138-109.000.

Ciardella, Robert L.: *See—*
Pickus, Milton R.; and Ciardella, Robert L., 4,088,512, Cl. 148-11.50F.

Ciarniello, Giorgio; and De Lena, Oscar, to Societa Italiana Vetro SIV S.p.A. Device for cutting out loads in a generator and battery fed plant. 4,088,940, Cl. 322-8.000.

Ciba-Geigy AG: *See—*
Smith, Norman Alfred, 4,088,648, Cl. 544-387.000.
Ciba-Geigy Corporation: *See—*
Felder, Louis; Kirchmayr, Rudolf; and Bellus, Daniel, 4,088,554, Cl. 204-159.150.
Hari, Stefan; Muller, Rolf; and Mory, Rudolf, 4,088,641, Cl. 260-156.000.
Karrer, Friedrich, 4,088,776, Cl. 424-282.000.
Vlattas, Isidoros, 4,088,779, Cl. 424-285.000.
Ciganek, Engelbert, to Du Pont de Nemours, E. I., and Company. Methanodibenzocycloheptapyrroles. 4,088,772, Cl. 424-274.000.
Cincinnati Butchers' Supply Co., The: *See—*
Herzog, Raymond A., 4,088,079, Cl. 104-111.000.
Citibank N.A.: *See—*
Gott, Stephen P., 4,088,981, Cl. 340-146.3SY.
Citizen Watch Company, Limited: *See—*
Ebihara, Heihachiro; and Uchino, Misao, 4,087,958, Cl. 58-25.000.
Ishizuka, Shinichi; and Sugimoto, Kenji, 4,087,890, Cl. 29-27.00C.
Miyasaka, Kenzi; Murata, Mitsuhiro; and Uematsu, Hiroyuki, 4,087,957, Cl. 58-23.00R.
Ciurca, Samuel J., Jr.: *See—*
Chang, Jack C.; Marr, Peter A.; and Ciurca, Samuel J., Jr., 4,088,488, Cl. 96-29.00D.
Clampitt, Roy; and Jefferies, Derek Kirk, to United Kingdom Atomic Energy Authority. Ion source including a pointed solid electrode and reservoir of liquid material. 4,088,919, Cl. 313-362.000.
Clark Equipment Co.: *See—*
Lilly, George E., 4,088,232, Cl. 214-16.40A.
Clark, Franklin T., Jr., to Tantera, Inc. Broom. 4,087,880, Cl. 15-175.000.
Clarke-Gravely Corporation: *See—*
Lowder, Dale E., 4,088,148, Cl. 137-625.470.
Clarke, Michael Willam: *See—*
Bevan, David William; Clarke, Michael Willam; Haisman, Derek Robin; and Pendlington, Sydney, 4,088,790, Cl. 426-96.000.
Clarke, William A. Game ball with flexible plastic foam tail. 4,088,319, Cl. 273-58.00R.
Clavin, Edward A., to Midcon Pipeline Equipment Co. Pipe bending mandrel. 4,088,007, Cl. 72-466.000.
Clayton, Donna M.; and Martinez, Donna J. Massage appliance. 4,088,127, Cl. 128-24.100.
Clifford, Douglas M.: *See—*
Miller, Bradley W.; Hickenlooper, Franklin T.; Uhlrich, David C.; Godfrey, Marl D.; Clifford, Douglas M.; James, Rex L.; Watson, Robert E.; Keith, John C.; and Mortensen, Alan C., 4,089,059, Cl. 364-706.000.
Close, Albert R., to American Safety Equipment Corporation. Dual tension single spring retractor. 4,088,281, Cl. 242-107.000.
Clow, Richard G. Multi-mode threshold laser. 4,088,964, Cl. 331-94.50C.
Clupak, Inc.: *See—*
Groome, Ernest J., 4,088,731, Cl. 264-282.000.
Coal Industry (Patents) Limited: *See—*
Jarvis, William Joseph; and Smith, Terence, 4,088,370, Cl. 299-43.000.
Cobaugh, Robert Franklin; and Parmer, Kenneth Ronald, to AMP Incorporated. Method of selectively applying solder onto conductors. 4,087,906, Cl. 29-630.00D.
Coburn Optical Industries, Inc.: *See—*
Choyce, D. Peter; and Jalie, Mohammed, 4,087,866, Cl. 3-13.000.
Coffee, Edward Charles John: *See—*
Caton, Michael Peter Lear; Coffee, Edward Charles John; and Watkins, Gordon Leonard, 4,088,695, Cl. 260-590.00C.
Coffee, Robert D.: *See—*
Howell, Eddie P.; Gant, Orland J., Jr.; Hearn, Daniel P.; and Coffee, Robert D , 4,088,945, Cl. 324-10.000.
Coffey, James P.: *See—*
Bernstein, Philip; and Coffey, James P., 4,088,628, Cl. 260-42.460.
Cohen, Paul; and Redding, Arnold H., to Westinghouse Electric Corp. Apparatus and method for thermal power generation. 4,087,985, Cl. 60-644.000.
Coleman Mfg. Co.: *See—*
Wolfe, Robert W., 4,087,941, Cl. 49-450.000.
Colgate-Palmolive Company: *See—*
Kenkare, Divaker B.; Gray, Frederick W.; and Shumway, Durland K., 4,088,751, Cl. 424-47.000.
Klingaman, Richard James, 4,088,246, Cl. 222-88.000.
Colgate, Stirling A. Apparatus for inhibiting explosive mixing of liquid natural gas and water. 4,088,193, Cl. 169-45.000.
Collepardi, Mario, to Emesa Aktiengesellschaft. Method of producing high strength cement conglomerates. 4,088,504, Cl. 106-90.000.
Colombo, Paolo: *See—*
Radici, Pierino; Erini, Pietro; Santini, Umberto; and Colombo, Paolo, 4,088,818, Cl. 544-186.000.
Comer, Donald T., to Precision Monolithics, Inc. Self-adjusting compatibility circuit for digital to analog converter. 4,088,905, Cl. 307-358.000.
Comiskey, John T.: *See—*
Foster, Bill D.; Comiskey, John T.; and Degner, LeRoy H., 4,088,025, Cl. 73-423.00R.
Commissariat a l'Energie Atomique: *See—*
Andrieu, Jean-Louis; and Delafosse, Jacques, 4,088,534, Cl. 176-38.000.
Compagnie Generale des Etablissements Michelin: *See—*
Boileau, Jacques; and Mathevet, Albert, 4,088,168, Cl. 152-352.00R.
Compagnie Industrielle de Procedes & d'Applications S.A.: *See—*
Godel, Albert Andre, 4,088,745, Cl. 423-659.000.
Compagnie Industrielle des Telecommunications Cit-Alcatel S.A.: *See—*
Migeon, Rene, 4,088,850, Cl. 179-170.00J.
Computer Ribbon Systems, Inc.: *See—*
Nicholson, Albert N., 4,088,800, Cl. 427-8.000.
Concast AG: *See—*
Schmid, Markus; and Fuchs, Adolf, 4,087,918, Cl. 33-174.00P.
Connor, Ralph Fredrick: *See—*
Bannister, James Edward; and Connor, Ralph Fredrick, 4,088,428, Cl. 418-270.000.
Conroy, Peter J., to Motorola, Inc. Multifrequency microstrip antenna. 4,089,003, Cl. 343-700.0MS.
Container Corporation of America: *See—*
Michetti, Louis C., 4,088,263, Cl. 229-37.00R.
Continental Can Company, Inc.: *See—*
Pan, Peter Naw Yank, 4,088,093, Cl. 118-630.000.
Continental Oil Company: *See—*
Umphrey, Ronald W.; Plate, Thomas H.; McCain, David L.; and Sweeney, William T., 4,089,053, Cl. 366-349.000.
Control Data Corporation: *See—*
Mars, James Robert, 4,089,045, Cl. 362-390.000.
Control Devices, Incorported: *See—*
Krechel, Joseph L.; and Purvis, Michael J., 4,088,147, Cl. 137-223.000.
Conwed Corporation: *See—*
Wiegand, Donald E., 4,088,805, Cl. 428-310.000.
Cooper, Anthony R.; Booth, Robin G.; and Matzinger, David P., to Dynapol. Ultrafiltration purification of solution of polymeric anthraquinone colorants. 4,088,572, Cl. 210-23.00F.
Cooper, Glenn Dale; and Watson, James Wilson, Jr., to General Electric Company. Process for isolation and purification of polyphenylene ethers. 4,088,634, Cl. 260-47.0ET.
Cooper, Tom O.; and Miller, William E., to United States of America, Energy. Method of preparing a powdered, electrically insulative separator for use in an electrochemical cell. 4,087,905, Cl. 29-623.100.
Cooperheat: *See—*
Dohren, David George, 4,088,439, Cl. 432-225.000.
Copenhagen, Richard I.: *See—*
Cruse, Harry R.; and Copenhagen, Richard I., 4,088,071, Cl. 100-245.000.
Corning Glass Works: *See—*
Berleue, Albert J.; and Dumbaugh, William H., Jr., 4,088,023, Cl. 73-334.000.
Bourg, Andre; Hazart, Jean P. M.; and Jouret, Jacques Y., 4,088,470, Cl. 65-105.000.
Hartnell, Freeman H., 4,088,225, Cl. 206-419.000.
Hawk, Robert M., 4,088,386, Cl. 350-96.210.
Young, Peter L., 4,089,039, Cl. 361-322.000.
Cornwell, Charles E.; and Plunguian, Mark. Cementitious coatings and method. 4,088,804, Cl. 428-220.000.
Cornwell, Charles E.; and Plunguian, Mark. Shaped articles of hydraulic cement compositions with a glossy reflective surface and reinforced with fiber glass. 4,088,808, Cl. 428-409.000.
Correll, Curtis V., Sr.: *See—*
West, William F.; and Correll, Curtis V., Sr., 4,088,055, Cl. 89-1.50D.
Corrigan, Ara L., to Caterpillar Tractor Co. Recoil spring lock device. 4,088,377, Cl. 305-10.000.
Costello, Clifford T. Scaffolding cart. 4,088,202, Cl. 182-13.000.
Cote, Robert: *See—*
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, 4,088,551, Cl. 204-129.000.
Coulmance, Jean-Pierre Rene; and Six, Jean-Claude Gerard, to U.S. Philips Corporation. Power limiting device for an electronically controlled electric heating system. 4,088,871, Cl. 219-497.000.
Councell, Graham D. Multiple liner roll support. 4,088,277, Cl. 242-58.600.
Courtaulds Limited: *See—*
Robinson, Frank; Girt, Keith Harry; and Whatmough, Nigel Stephen, 4,087,991, Cl. 66-189.000.
Courty, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Sugier, Andre, to Institut Francais du Petrole. Process for purifying a gas containing hydrogen sulfide and contact masses usable therefor. 4,088,736, Cl. 423-230.000.
Coutin, Pierre F.: *See—*
Hasquenoph, Jean H.; and Coutin, Pierre F., 4,088,287, Cl. 244-137.00R.
Cowley, David; and Phillips, Raymond Jeffrey, to John Laing and Son Limited. Lifting apparatus. 4,088,200, Cl. 182-2.000.
Crandall, Kenneth C., to Elan Industries, Inc. Electronic polling and calling communication system. 4,088,983, Cl. 340-147.00R.
Crane Co.: *See—*
Maciulaitis, Vytautas K.; and Dhanani, Rasikant R., 4,088,299, Cl. 251-173.000.
Crawley, Lantz Stephen: *See—*
Fanshawe, William Joseph; Epstein, Joseph William; Crawley, Lantz Stephen; Hofmann, Corris Mabelle; and Safir, Sidney Robert, 4,088,652, Cl. 260-293.540.
Credelle, Thomas Lloyd: *See—*
Siekanowicz, Wieslaw Wojciech; Anderson, Charles Hammond; and Credelle, Thomas Lloyd, 4,088,920, Cl. 313-422.000.

Crellin, Robin Arthur: *See—*
Horsewell, Henry George; and Crellin, Robin Arthur, 4,088,142, Cl. 131-9.000.

Cresswell, Ronald M.; and Holstius, Elvin A., to Burroughs Wellcome Co. Method and preparation for increasing bioavailability of digoxin. 4,088,750, Cl. 424-37.000.

Cross, Charles K.: *See—*
Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., 4,088,793, Cl. 426-266.000.

Crowley, James D.; Weller, Joseph F.; and Giallorenzi, Thomas G., to United States of America, Navy. Tapped surface acoustic wave delay line. 4,088,969, Cl. 333-30.00R.

Cruse, Harry R.; and Copenhagen, Richard I., to Pacific Waste Equipment Corporation, by said Richard I. Copenhagen. Refuse compactor. 4,088,071, Cl. 100-245.000.

Crystal, Richard G.; and Walton, Frank J., to Xerox Corporation. Process for preparing ink releasing stencil. 4,088,073, Cl. 101-128.400.

Culling, John H., to Carondelet Foundry Company. Corrosion-resistant alloys. 4,088,478, Cl. 75-134.00C.

Cumbers, David Charles, to Imperial Chemical Industries Limited. Method of making non-woven fabrics. 4,088,726, Cl. 264-123.000.

Cunningham, Hugh: *See—*
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, 4,088,551, Cl. 204-129.000.

Cyborg Corporation: *See—*
Forgione, Albert G.; and Horton, Richard M., 4,088,125, Cl. 128-2.10Z.

Cyrus, Richard; and Raschack, Manfred, to Knoll A.G. Chemische Fabriken. Alkylenedioxy piperazine derivatives. 4,088,763, Cl. 424-250.000.

Czerepinski, Ralph G.; Hecht, Jeffrey K.; and Chiu, Thomas T., to Dow Chemical Company, The. Organic photoconducting compositions containing aromatic sulfonyl fluorides and their use in electrophotographic processes. 4,088,482, Cl. 96-1.50R.

Daane nee Pluim, Gerdina J. R.: *See—*
Fernley, George W.; and Daane nee Pluim, Gerdina J. R., 4,088,594, Cl. 252-89.00R.

Dahle, Orvar; Von Knorring, Folke; Nordvall, Jan; and Siby, Sture, to ASEA Aktiebolag. Magneto-elastic transducer. 4,088,013, Cl. 73-141.00A.

Dahlgren, Harold P.; and Dahlgren, Harvey W. Apparatus for inking printing plates. 4,088,074, Cl. 101-350.000.

Dahlgren, Harvey W.: *See—*
Dahlgren, Harold P.; and Dahlgren, Harvey W., 4,088,074, Cl. 101-350.000.

Dai-Ichi Kogyo Seiyaku Co., Ltd.: *See—*
Mori, Shigeo; and Fujita, Takeshi, 4,088,614, Cl. 260-2.5AJ.

Dai Nippon Toryo Co., Ltd.: *See—*
Fukuda, Yoshihiko; Ishimori, Hidefumi; Toyomatsu, Masafumi; Tsubone, Masayoshi; Mizuguchi, Hideki; and Masuda, Hideo, 4,088,434, Cl. 425-467.000.

Dail, John P., Jr.; and van den Berg, Pieter, to C. van der Lely N.V. Rotary harrow and attachments. 4,088,083, Cl. 111-13.000.

Daimler-Benz Aktiengesellschaft: *See—*
Bruggemann, Hans; and Heilemann, Otto, 4,088,347, Cl. 285-24.000.
Gallitzendorfer, Josef; Pfeiffer, Peter; Tomforde, Johann; and Gotz, Hans, 4,088,366, Cl. 296-154.000.
Holzapfel, Immanuel, 4,088,437, Cl. 431-161.000.
Klie, Wolfgang; Hutai, Hubert; and Fischer, Wolfgang, 4,088,357, Cl. 293-98.000.

Dallaire, Jean Guy, to Canada, Her Majesty the Queen in right of, as represented by the Minister of Defence. Gas initiated cartridges. 4,088,056, Cl. 89-1.700.

Dann, Robert Sidney, to B. O. Morris Limited. Chuck for driving tap or like rotary tool. 4,088,418, Cl. 408-139.000.

D'Arca, Stephen S., to Alpha Nova Development Corp. Card tray. 4,088,081, Cl. 108-27.000.

Darlington, William B.: *See—*
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, 4,088,551, Cl. 204-129.000.

Data Card Corporation: *See—*
LaManna, Richard J.; Drillick, Jacob H.; and Polad, Michael D., 4,088,216, Cl. 400-130.000.

Data General Corporation: *See—*
Gruner, Ronald Hans, 4,089,052, Cl. 364-200.000.

Date, Nobuaki; Watanabe, Yoshiaki; Sunouchi, Akio; Mashimo, Yukio; Ito, Fumio; and Ito, Tadashi, to Canon Kabushiki Kaisha. Exposure information setting device for camera. 4,089,011, Cl. 354-23.00D.

D'Atre, John Douglas; Lipo, Thomas Anthony; and Plunkett, Allan Barr, to General Electric Company. Means for stabilizing an a-c electric motor drive system. 4,088,934, Cl. 318-227.000.

D'Atre, John Douglas; and Plunkett, Allan Barr, to General Electric Company. Stabilizing scheme for an a-c electric motor drive system. 4,088,935, Cl. 318-227.000.

Daugirdas, Kristupas: *See—*
Elguindy, Samir Mostafa; and Daugirdas, Kristupas, 4,087,939, Cl. 49-118.000.

Davison, Sol: *See—*
Gergen, William P.; and Davison, Sol, 4,088,626, Cl. 260-42.180.
Gergen, William P.; and Davison, Sol, 4,088,627, Cl. 260-42.180.
Gergen, William P.; and Davison, Sol, 4,088,711, Cl. 260-873.000.

Davlin, Irwin H. Regulating flow. 4,087,892, Cl. 29-157.10R.

Davlyatshin, Garifulla: *See—*
Vydrin, Vladimir Nikolaevich; Dukmasov, Vladimir Georgievich; and Davlyatshin, Garifulla, 4,087,999, Cl. 72-245.000.

Dawson, Alan Bartholomew Cairns: *See—*
Bolang, Per Axel; and Dawson, Alan Bartholomew Cairns, 4,088,039, Cl. 74-479.000.

Day, James R., to Monsanto Company. Crushable bobbin package for conjugate yarn. 4,088,282, Cl. 242-118.200.

Debnam, William J., Jr.: *See—*
United States of America, National Aeronautics and Space Administration; Debnam, William J., Jr.; Fales, Carl L., Jr.; Breckenridge, Roger A.; and Pohm, Arthur V., 4,088,954, Cl. 324-249.000.

de Choudens, Christian: *See—*
Berger, Pierre; de Choudens, Christian; Lombardo, Gerard; and Monzie, Pierre, 4,088,528, Cl. 162-19.000.

Deere & Company: *See—*
Jewett, James Wilson; and Beemer, Terry Wayne, 4,088,372, Cl. 301-63.00R.
Schreiner, Lester Dale; and Steilen, Ronald Michael, 4,088,346, Cl. 280-656.000.
Soteropulos, Gust, 4,088,069, Cl. 100-88.000.
Termont, Charles George, 4,088,364, Cl. 296-28.00C.
Wilson, John Edward; and Hengen, Edward John, 4,087,953, Cl. 56-14.600.

Degner, LeRoy H.: *See—*
Foster, Bill D.; Comiskey, John T.; and Degner, LeRoy H., 4,088,025, Cl. 73-423.00R.

Delafosse, Jacques: *See—*
Andrieu, Jean-Louis; and Delafosse, Jacques, 4,088,534, Cl. 176-38.000.

Delaplaine, Robert W.; and Mossolani, Daniel L., to United States of America, National Aeronautics and Space Administration. Rotary leveling base platform. 4,088,291, Cl. 248-186.000.

Del Bon, Luigi. Fountain brush. 4,088,412, Cl. 401-151.000.

De Lena, Oscar: *See—*
Ciarniello, Giorgio; and De Lena, Oscar, 4,088,940, Cl. 322-8.000.

della Porta, Paolo: *See—*
Giorgi, Tiziano A.; and della Porta, Paolo, 4,088,456, Cl. 55-179.000.

Dell Orfano, William. Plug-type transient surge suppressor. 4,089,032, Cl. 361-56.000.

Delmore, Martin F., to Erico Products, Inc. Lay-in light fixture retainer clip. 4,088,293, Cl. 248-500.000.

Delta Materials Research Limited: *See—*
Hart, William Barrie, 4,087,971, Cl. 60-527.000.

Demin, Alexandr Viktorovich; Balezin, Igor Nikolaevich; Kosinsky, Konstantin Alexeevich; Serebrennikov, Vladimir Nikolaevich; Popov, Vadim Likarionovich; Shipkov, Nikolai Nikolaevich; and Dovguchits, Eduard Fedorovich. Backing for weld underside formation. 4,088,503, Cl. 106-56.000.

Denchfield, Jerrold R.: *See—*
Wiese, Harry C.; Denchfield, Jerrold R.; Ahlborn, John C., deceased; and Ahlborn, Lloyd Keys, executor, 4,088,453, Cl. 44-51.000.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Derivatives of imidazo(4,5-b)pyridines. 4,088,654, Cl. 260-295.50B.

Denzer, Richard E.: *See—*
Winchell, Frank J.; Winkelmann, Klaus O.; Mrlik, Jerry R.; Denzer, Richard E.; and Williams, Jerry K., 4,088,338, Cl. 280-220.000.

DePas, Laddie A., Sr., to Miller, M. L. Automatic skid and spin control system for vehicle brakes and method. 4,088,375, Cl. 303-96.000.

Depew, Noel F., to NCR Corporation. Ribbon cassette with bi-color capability. 4,088,218, Cl. 400-208.000.

de Putter, Warner Jan, to Wavin B. V. Extruder with degassing. 4,088,307, Cl. 366-75.000.

Deschamps, Andre: *See—*
Courty, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Sugier, Andre, 4,088,736, Cl. 423-230.000.

Deschamps, Jacques, to Thomson-CSF. Method of utilizing a storage tube employing a non-destructive reading. 4,088,925, Cl. 315-13.0ST.

De Schepper, Achille; and Van Peteghem, Antoine, to Metallurgie Hoboken-Overpelt. Process for liquid-liquid extraction of cobalt from nickel. 4,088,733, Cl. 423-139.000.

Desjardins, Rene A.; Ellis, Charles W.; and Sankewitsch, Vladimir, to Boeing Company, The. Vibration isolation system. 4,088,042, Cl. 74-574.000.

de Souza, Noel John: *See—*
Bhat, Sujata Vasudev; de Souza, Noel John; Dornauer, Horst; Bhattacharya, Bani Kanta; and Dohadwalla, Alihusein Nomanbhai, 4,088,659, Cl. 260-345.200.

DeTorre, Robert P., to PPG Industries, Inc. Apparatus for opening lateral scores in moving glass sheets. 4,088,255, Cl. 225-98.000.

Detroit Bullet Trap Corporation: *See—*
Nikoden, Joseph, Jr., 4,088,322, Cl. 273-105.600.

Detroit Osteopathic Hospital Corp.: *See—*
Meixner, Gary Howard, 4,088,889, Cl. 250-470.000.

Detroit, William John, to American Can Company. Ozonated lignosulfonates. 4,088,640, Cl. 260-124.00R.

Deuber, John Martin; and Stevens, Peter, to Oxy Metal Industries Corporation. Bright low karat silver gold electroplating. 4,088,549, Cl. 204-43.00G.

Deussner, Herbert; Ramesohl, Hubert; and Herchenbach, Horst, to Klockner-Humboldt-Deutz Aktiengesellschaft. Apparatus for the heat treatment of fine-grained material. 4,088,438, Cl. 432-106.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
Hofen, Willi; Prescher, Gunter; Siekmann, Gerd; and Wolf, Gunter, 4,088,676, Cl. 260-502.00R.
Morlock, Gerhard; and Stehlik, Gerhard, 4,088,597, Cl. 252-106.000.
Prescher, Gunter; Weiberg, Otto; Waldmann, Helmut; and Seifert, Hermann, 4,088,679, Cl. 260-502.00R.
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,088,593, Cl. 252-89.00R.

Deutschenbaur, Paul: *See*—
Lippacher, Wolfgang; Deutschenbaur, Paul; and Teger, Gerhard, 4,088,054, Cl. 85-84.000.

Development Finance Corporation: *See*—
Benseman, Roy Fergus, 4,088,118, Cl. 126-271.000.

Deveson, Maxwell Ivan. Ice making and vending machines. 4,088,243, Cl. 221-93.000.

Devine, Janet, to Christiana Metals Corporation. Ultrasonic spot welder. 4,088,257, Cl. 228-110.000.

Dey, Ervin J., to Standard Pressed Steel Co. Quick-acting fastener assembly. 4,088,355, Cl. 292-251.000.

Dey, Thomas W., to Bausch & Lomb Incorporated. Luminaire. 4,088,883, Cl. 362-263.000.

Dhanani, Rasikant R.: *See*—
Maciulaitis, Vytautas K.; and Dhanani, Rasikant R., 4,088,299, Cl. 251-173.000.

Diack, Archibald W.; Welborn, Warren S.; and Rullman, Robert G., to Cardiac Resuscitator Corp. Cardiac resuscitator and monitoring apparatus. 4,088,138, Cl. 128-419.00D.

Diamond, Julius; and Douglas, George H., to William H. Rorer, Inc. Amidinoureas for the treatment of cardinascular disorders. 4,088,785, Cl. 424-322.000.

Diamond Shamrock Corporation: *See*—
Malkin, Irving, 4,088,550, Cl. 204-95.000.

Diamond Shamrock Technologies, S.A.: *See*—
Pellegri, Alberto; and Santi, Rinaldo, 4,088,556, Cl. 204-222.000.

Dickinson, David W.: *See*—
Tyler, Derek E.; Dickinson, David W.; Dore, James E.; and Khan, Abid A., 4,088,475, Cl. 75-76.000.

Dickinson, Richard M.: *See*—
United States of America, National Aeronautics and Space Administration; and Dickinson, Richard M., 4,088,999, Cl. 343-113.00R.

Dietrich, Paul: *See*—
Smith, Alistair Y.; Dietrich, Paul; and Pickenhagen, Wilhelm, 4,088,649, Cl. 544-385.000.

DiGiulio, Mario. Appliance for foot orthosis. 4,088,129, Cl. 128-80.00A.

Di Maio, Anthony E.; and Todisco, Joseph G., to Marson Fastener Corporation. Fastening tool device. 4,088,004, Cl. 72-391.000.

Dimarco, Bernard: *See*—
Kussy, Frank W.; Dimarco, Bernard; Kralik, Andrew J.; and Krueger, Keith T., 4,088,973, Cl. 335-6.000.

Dimitrov, Spas Petrov: *See*—
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.

Ditcher, John, to A-Lok Corporation. Lifting arrangements for massive objects. 4,088,361, Cl. 294-89.000.

Docks Unlimited: *See*—
Kuhlman, Tom Evan, 4,087,977, Cl. 61-48.000.

Doe, Ewart H.; and Linforth, William J., to Twyford Moors (Aircraft & Engineering) Ltd. Control means for a bar holder and feeder coupled to an automatic machine tool. 4,088,230, Cl. 214-1.200.

Doerges, Alexander: *See*—
Bratzler, Karl; Doerges, Alexander; Hochgesand, Gerhard; and Kriebel, Manfred, 4,088,735, Cl. 423-219.000.

Dohadwalla, Alihusein Nomanbhai: *See*—
Bhat, Sujata Vasudev; de Souza, Noel John; Dornauer, Horst; Bhattacharya, Bani Kanta; and Dohadwalla, Alihusein Nomanbhai, 4,088,659, Cl. 260-345.200.

Doherty, Thomas E.: *See*—
Amberg, Stephen W.; and Doherty, Thomas E., 4,088,526, Cl. 156-446.000.

Dohren, David George, to Cooperheat. Tangentially gas fired muffle. 4,088,439, Cl. 432-225.000.

Doller, John S.; and Kitchin, Oscar G., to General Motors Corporation. Overrunning roller clutch with improved cage and bearing block. 4,088,211, Cl. 192-45.000.

Donahue, Thomas Harbison, to International Telephone and Telegraph Corporation. Radar MTI system using a noncoherent transmitter. 4,089,001, Cl. 343-7.700.

Dore, James E.: *See*—
Tyler, Derek E.; Dickinson, David W.; Dore, James E.; and Khan, Abid A., 4,088,475, Cl. 75-76.000.

Dormoy, Michel Jean-Claude: *See*—
Bhattacharyya, Asita; Dormoy, Michel Jean-Claude; and Richard, Gerard Yves, 4,088,624, Cl. 260-38.000.

Dornauer, Horst: *See*—
Bhat, Sujata Vasudev; de Souza, Noel John; Dornauer, Horst; Bhattacharya, Bani Kanta; and Dohadwalla, Alihusein Nomanbhai, 4,088,659, Cl. 260-345.200.

Douglas, George H.: *See*—
Diamond, Julius; and Douglas, George H., 4,088,785, Cl. 424-322.000.

Douglas, George R.: *See*—
Jones, Charles H.; and Douglas, George R., 4,088,907, Cl. 310-333.000.

Douglas, Walter M., to UOP Inc. Mercaptan oxidation in a liquid hydrocarbon with a metal phthalocyanine catalyst. 4,088,569, Cl. 208-206.000.

Dovguchits, Eduard Fedorovich: *See*—
Demin, Alexandr Viktorovich; Balezin, Igor Nikolaevich; Kosinsky, Konstantin Alexeevich; Serebrennikov, Vladimir Nikolaevich; Popov, Vadim Likarionovich; Shipkov, Nikolai Nikolaevich; and Dovguchits, Eduard Fedorovich, 4,088,503, Cl. 106-56.000.

Dow Chemical Company, The: *See*—
Czerepinski, Ralph G.; Hecht, Jeffrey K.; and Chiu, Thomas T., 4,088,482, Cl. 96-1.50R.
Walker, Lynn Charles, 4,088,447, Cl. 23-230.00R.

Dow Corning Corporation: *See*—
Malek, James R.; Speier, John L.; and Wright, Antony P., 4,088,669, Cl. 260-448.80R.

Downey, Robert Andrew: *See*—
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,088,471, Cl. 65-182.00R.

Doyel, John S. Nutcracker device. 4,087,910, Cl. 30-120.500.

Doyle, Darrold E.; and Barnum, Thomas G., to Bradley Corporation. Timed metering valve. 4,088,297, Cl. 251-44.000.

Draiswerke GmbH, Firma: *See*—
Muller, Helmut, 4,088,577, Cl. 210-67.000.

Dresner, Joseph; and Goldstein, Bernard, to RCA Corporation. Magnesium oxide dynode and method of preparation. 4,088,510, Cl. 148-6.300.

Dresser Industries, Inc.: *See*—
Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, 4,088,457, Cl. 55-194.000.

Drews, Ulrich: *See*—
Adler, Karl-Heinz; Drews, Ulrich; Werner, Peter; Moller, Heinz; and Kammerer, Heinz, 4,088,927, Cl. 315-209.00T.

Drillick, Jacob H.: *See*—
LaManna, Richard J.; Drillick, Jacob H.; and Polad, Michael D., 4,088,216, Cl. 400-130.000.

Drone, Gary Alan, to Fiat-Allis Construction Machinery, Inc. Steering clutch and brake control apparatus. 4,088,209, Cl. 192-13.00R.

Ducellier et Cie.: *See*—
Chateau, Louis Jean, 4,088,107, Cl. 123-148.00E.

Duchemin, Michel, to Ressorts du Nord S.A. Elastically yieldable rail fastener and rail fixing device including said fastener. 4,088,267, Cl. 238-349.000.

Duke, Peter James; Leff, Jerry; Liclican, Leo Calica; and Powell, Mark Vernon, to International Business Machines Corporation. Single level masking process with two positive photoresist layers. 4,088,490, Cl. 96-36.200.

Dukmasov, Vladimir Georgievich: *See*—
Vydrin, Vladimir Nikolaevich; Dukmasov, Vladimir Georgievich; and Davlyatshin, Garifulla, 4,087,999, Cl. 72-245.000.

Dulin, Patrick J.; Gorman, Thomas G.; Robb, Neil E.; and Wickham, Robert G., to Hayes-Albion Corporation. Heavy duty radiator cooling fan. 4,088,423, Cl. 416-210.00R.

Dumbaugh, William H., Jr.: *See*—
Berleue, Albert J.; and Dumbaugh, William H., Jr., 4,088,023, Cl. 73-334.000.

Dunlop Limited: *See*—
Binns, Keith, 4,088,219, Cl. 198-323.000.
Marjoram, John Ernest, 4,088,722, Cl. 264-40.400.

Dunwald, Willi: *See*—
Zecher, Wilfried; Dunwald, Willi; and Merten, Rudolf, 4,088,637, Cl. 260-77.5TB.

Du Pont de Nemours, E. I., and Company: *See*—
Bacher, Rudolph John, 4,089,038, Cl. 361-320.000.
Ciganek, Engelbert, 4,088,772, Cl. 424-274.000.
Pecoraro, Joseph Michael, 4,088,588, Cl. 252-51.50A.
Wetzel, Roland Herman, 4,088,506, Cl. 106-288.00Q.

Durant, Graham John: *See*—
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,088,769, Cl. 424-270.000.

Dvorak, Charles: *See*—
Roszkowski, Adolph P.; Beard, Colin C.; Dvorak, Charles; and Weinhardt, Klaus, 4,088,771, Cl. 424-273.00R.

Dyer, David; and Wilmshurst, Trevor H., to British Steel Corporation. Electronic monitoring apparatus. 4,089,055, Cl. 364-551.000.

Dynamit Nobel Aktiengesellschaft: *See*—
Mecklenburg, Gunther, 4,087,944, Cl. 52-241.000.

Dynapol: *See*—
Cooper, Anthony R.; Booth, Robin G.; and Matzinger, David P., 4,088,572, Cl. 210-23.00F.

E. R. Squibb & Sons, Inc.: *See*—
Breuer, Hermann; and Treuner, Uwe D., 4,088,815, Cl. 544-26.000.
Denzel, Theodor; and Hoehn, Hans, 4,088,654, Cl. 260-295.50B.
Treuner, Uwe D.; and Breuer, Hermann, 4,088,816, Cl. 544-27.000.

Easco-Sparcatron, Inc.: *See*—
O'Connor, Thomas J., 4,088,032, Cl. 74-25.000.

Eastman Kodak Company: *See*—
Ahlquist, Gary W.; and Milley, Michael K., 4,088,411, Cl. 356-167.000.
Bissonette, Vernon L., 4,088,486, Cl. 96-22.000.
Brust, David Philip; Chen, Tsang Jan; Ponticello, Ignazio Salvatore; and Pierce, Zona Reynolds, 4,088,499, Cl. 96-29.00D.

Chang, Jack C.; Marr, Peter A.; and Ciurca, Samuel J., Jr., 4,088,488, Cl. 96-29.00D.
Merkel, Paul Barrett, 4,088,496, Cl. 96-114.100.
Morrison, Edward Dixon; and Lu, Chen-i, 4,088,552, Cl. 204-157.10R.
Phillips, Ronald Alfred, 4,088,314, Cl. 271-176.000.
Seymour, Robert W.; Weaver, James C.; and Gray, Theodore F., Jr., 4,088,709, Cl. 260-860.000.
Watkins, Windell C., 4,088,602, Cl. 252-437.000.
Watson, Robert L.; and Finley, Donald L., 4,088,016, Cl. 73-160.000.

Eastmond, Bruce Charles, to Motorola, Inc. Split phase code synchronizer and demodulator. 4,088,832, Cl. 178-69.100.

Eaton Corporation: *See—*
Garrett, Wayne H.; Stringer, Theodore H., III; and Zbikowski, Ted, 4,088,206, Cl. 188-196.00D.
Knapp, Kenneth K., 4,087,967, Cl. 60-392.000.

Ebauches S.A.: *See—*
Laesser, Claude, 4,087,959, Cl. 58-116.00M.

Ebihara, Heihachiro; and Uchino, Misao, to Citizen Watch Company, Limited. Timepiece apparatus. 4,087,958, Cl. 58-25.000.

Echtler, Joseph P., to United States of America, Energy. Non-plugging pressure tap. 4,088,155, Cl. 138-41.000.

Edelstein, Arthur, to Ardel Kinamatic. Optical mount with independently orthogonally adjustable element. 4,088,396, Cl. 350-252.000.

Edmisson, Russell Curtis; May, Herbert; and St. Pierre, Raymond Marie, to Mattel, Inc. Toy vehicle with housing. 4,087,935, Cl. 46-202.000.

Edstrom, Kjell: *See—*
Nilsson, Goran Alfred; Edstrom, Kjell; and Wiklund, Henry, 4,088,062, Cl. 91-50.000.

Edwards, Douglas P. Shower curtain anchor attachment. 4,088,174, Cl. 160-349.00R.

Edwards, Grant Campbell: *See—*
Vaughan, David Evan William; and Edwards, Grant Campbell, 4,088,739, Cl. 423-329.000.

Edwards, Thomas C., to Rovac Corporation, The. Sliding vane type of compressor-expander having differential eccentricity feature. 4,088,426, Cl. 418-8.000.

Efimov, Viktor Alexeevich: *See—*
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.

Egner, Robert J.: *See—*
Jacoby, Peter H.; Seiz, Carl Gary; and Egner, Robert J., 4,088,229, Cl. 211-191.000.

Ehmig, Gerhard, to VAT Aktiengesellschaft fur Vakuum-Apparate-Technik. Valve arrangement for a vacuum line. 4,088,301, Cl. 251-334.000.

Ehrmann, Karl: *See—*
Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, 4,088,853, Cl. 200-19.00R.

Eibeck, Richard E.: *See—*
Nychka, Henry R.; and Eibeck, Richard E., 4,088,704, Cl. 260-653.000.

Eikelberger, Rand Jeffery: *See—*
Bowman, Joseph Henry, Jr.; Eikelberger, Rand Jeffery; and Miller, Arnold M., 4,088,977, Cl. 338-32.00R.

Eisai Co., Ltd.: *See—*
Igarashi, Toshiji; and Ohtake, Shinzaburo, 4,088,778, Cl. 424-284.000.

Ekeuti, Masahiko: *See—*
Yamamoto, Yoshio; Sono, Masaki; and Ekeuti, Masahiko, 4,088,828, Cl. 174-68.500.

Elam, James O.; and Rudolph, Hans, to Jim E. Rand Training Systems, Inc., a part interest, by said James Elam. Breathing assistance device. 4,088,131, Cl. 128-145.700.

Elan Industries, Inc.: *See—*
Crandall, Kenneth C., 4,088,983, Cl. 340-147.00R.

Elbling, Irving N.; and Saunders, Howard E., to Westinghouse Electric Corp. Low dissipation factor electrostatic epoxy wire coating powder. 4,088,809, Cl. 428-379.000.

Electro-Craft Corporation: *See—*
Schmidt, Robert H., 4,088,943, Cl. 322-90.000.

Electromatic Drive Corporation: *See—*
Hillman, Darrel D., 4,088,036, Cl. 74-230.17A.

Elektrostatische-Spritz-und Beflockungsgesellschaft G.F. Vohringer GmbH: *See—*
Vohringer, Gerhard Friedrich, 4,088,268, Cl. 239-15.000.

Elevator Contractors, Inc.: *See—*
Foster, Bill D.; Comiskey, John T.; and Degner, LeRoy H., 4,088,025, Cl. 73-423.00R.

Elger, Walter: *See—*
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,088,775, Cl. 424-278.000.

Elguindy, Samir Mostafa; and Daugirdas, Kristupas, to Vapor Corporation. Door operator with locking mechanism. 4,087,939, Cl. 49-118.000.

Eli Lilly and Company: *See—*
Archer, Robert A.; and Lemberger, Louis, 4,088,777, Cl. 424-283.000.
Paget, Charles J.; and Sands, John L., 4,088,768, Cl. 424-270.000.
Paget, Charles J., Jr., 4,088,770, Cl. 424-272.000.

Elitex, koncern textilniho strojirenstvi: *See—*
Vlcek, Karel; Pacakova, Zdena; Jirka, Bohuslav; Cesenek, Bedrich; and Jindra, Karel, 4,088,226, Cl. 209-82.000.

Elkins, Perry E.; Jones, A. Brooke; and Reekstin, John P., Jr., to Rockwell International Corporation. Actinic radiation emissive pattern defining masks for fine line lithography and lithography utilizing such masks. 4,088,896, Cl. 250-505.000.

Ellen, Leonard William. Musical instruments. 4,088,051, Cl. 84-331.000.

Elliott, Herbert James. Method of solidifying molten material. 4,088,727, Cl. 264-130.000.

Ellis, Charles W.: *See—*
Desjardins, Rene A.; Ellis, Charles W.; and Sankewitsch, Vladimir, 4,088,042, Cl. 74-574.000.

Ellis, Douglas G. Combination night light and sterilizing holder for toilet articles. 4,088,445, Cl. 21-83.000.

Ellis, Edric; Gelder, Richard; and Hale, Allan, to Pilkington Brothers Limited. Photochromic alumino-phosphate glasses. 4,088,501, Cl. 106-52.000.

Ellsworth, Orval T.: *See—*
Korner, Anneliese F.; Piziali, Robert L.; and Ellsworth, Orval T., 4,088,124, Cl. 128-1.00B.

Emanuelsson, Kaj Bengt Ingemar; and Eriksson, Sven Evald, to Atlas Copco Aktiebolag. Rotors for a screw rotor machine. 4,088,427, Cl. 418-201.000.

Emerson Electric Co.: *See—*
Bhat, Vasanth K.; Siegel, Allen E.; Vogel, Richard E.; and Burrows, Larry G., 4,088,105, Cl. 123-145.00A.

Emerson, Reginald Stanley, to Leslie Hartridge Limited. Fuel injection metering system. 4,088,012, Cl. 73-119.00A.

Emery, William Boyd, to Korry Manufacturing Co. Keyboard electromechanical switch with coil spring contact. 4,088,855, Cl. 200-16.00A.

Emesa Aktiengesellschaft: *See—*
Collepardi, Mario, 4,088,504, Cl. 106-90.000.

EMI Limited: *See—*
LeMay, Christopher Archibald Gordon, 4,088,887, Cl. 250-366.000.

Emmett, John Colin: *See—*
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,088,769, Cl. 424-270.000.

Emminger, Mary Souhan. Wall hangar device. 4,088,292, Cl. 248-205.00R.

Emmons, William D.; and Levy, Jerome F., to Rohm and Haas Company. Novel ester isocyanates. 4,088,674, Cl. 560-154.000.

Endo, Tomizo: *See—*
Suzuki, Seiichi; and Endo, Tomizo, 4,088,300, Cl. 251-319.000.

Engelhard Minerals & Chemicals Corporation: *See—*
Hindin, Saul G.; and Pond, George R., 4,088,435, Cl. 431-7.000.

Engler, Clifford G.; and Sipirora, Joseph J., to Varian Associates, Inc. NMR Spectrometer employing self centering turbine. 4,088,944, Cl. 324-.5AH.

English Electric Valve Company Limited: *See—*
Wheldon, Robert Joseph, 4,088,929, Cl. 315-347.000.

Epoch Company, Ltd.: *See—*
Sakurai, Hiroshi, 4,088,321, Cl. 273-85.00G.

Epstein, Joseph William: *See—*
Fanshawe, William Joseph; Epstein, Joseph William; Crawley, Lantz Stephen; Hofmann, Corris Mabelle; and Safir, Sidney Robert, 4,088,652, Cl. 260-293.540.

Erico Products, Inc.: *See—*
Delmore, Martin F., 4,088,293, Cl. 248-500.000.

Eriksson, Karl Erik. Method and device for measuring jump-lengths on a ski-jump. 4,089,057, Cl. 364-562.000.

Eriksson, Sven Evald: *See—*
Emanuelsson, Kaj Bengt Ingemar; and Eriksson, Sven Evald, 4,088,427, Cl. 418-201.000.

Erini, Pietro: *See—*
Radici, Pierino; Erini, Pietro; Santini, Umberto; and Colombo, Paolo, 4,088,818, Cl. 544-186.000.

ESB Incorporated: *See—*
Bernstein, Philip; and Coffey, James P., 4,088,628, Cl. 260-42.460.

Etablissements Pierre Angenieux: *See—*
Jourdan, Francis; Lepeytre, Jean-Paul; Masson, Andre; and Le Roux, Charles, 4,088,397, Cl. 350-253.000.

Etienne, Michel, to Automobiles Peugeot. Device for rapidly exchanging an accumulator battery on an electric vehicle. 4,087,895, Cl. 29-252.000.

Eto, Yoshizumi: *See—*
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, 4,088,391, Cl. 350-150.000.

Etter, Walter, to Bolex International SA. Device for guiding a tape out of a cassette opening. 4,088,283, Cl. 242-197.000.

Evans, Delme; Jolley, Michael Ralph John; Ross, William James; and Swann, Brian Picton, to Lilly Industries Limited. Acylamino derivatives. 4,088,773, Cl. 424-274.000.

Evans, Walter J.: *See—*
Hetke, Adolf; and Evans, Walter J., 4,088,477, Cl. 75-130.00R.

Evenson, Arthur Edward: *See—*
Goldish, Milton; and Evenson, Arthur Edward, 4,088,949, Cl. 324-62.000.

Evers, William J.; and Heinsohn, Howard H., Jr., to International Flavors & Fragrances Inc. α-Oxy(oxo) sulfides and ethers. 4,088,697, Cl. 260-609.00R.

Exxon Research & Engineering Co.: *See—*
Carter, James L.; and Sinfelt, John H., 4,088,603, Cl. 252-454.000.
Flory, John F., 4,088,089, Cl. 114-230.000.

Huff, Terrence, 4,088,714, Cl. 260-897.00A.
Langer, Arthur W., Jr.; and Whitney, Thomas A., 4,088,666, Cl. 260-439.00R.
Perry, Stephen F.; and Hall, Ralph R., 4,088,564, Cl. 208-33.000.
Rossi, Albert; and Fernandez, William J., 4,088,589, Cl. 252-56.00R.

F. Zimmermann & Co.: *See*—
Zimmermann, Gert, 4,088,144, Cl. 133-3.00F.

Fa. Alfred Hansel, Nieten- und Metallwarenfabrik: *See*—
Schwab, Manfred, 4,088,003, Cl. 72-391.000.

Fabian, Peter; Jedlitschka, Ernst; Krebs, Helmut; and Simon, Heinrich, to Heraeus Elektroden GmbH. Method of renewing electrodes. 4,088,558, Cl. 204-288.000.

Fabrica de Stofe de Mobila: *See*—
Barna, Gheorghe; Stefan, Silviu; Suselescu, Mircea; Barbu, Cornelius; Chiose, Sergiu; Lebada, Ioan; and Negulescu, Florian, 4,089,056, Cl. 364-551.000.

Fainzilberg, Leonid Solomonovich: *See*—
Zhitetsky, Leonid Sergeevich; and Fainzilberg, Leonid Solomonovich, 4,088,974, Cl. 364-472.000.

Fairbanks, Charles W.; and Kistner, John F., to Minnesota Mining and Manufacturing Company. Water extended hydrophilic molding compositions. 4,088,500, Cl. 106-35.000.

Falcon Safety Products, Inc.: *See*—
Breslau, Steven M.; Grossman, Morris Gary; and Levy, Edward D., 4,087,926, Cl. 34-70.000.

Fales, Carl L., Jr.: *See*—
United States of America, National Aeronautics and Space Administration; Debnam, William J., Jr.; Fales, Carl L., Jr.; Breckenridge, Roger A.; and Pohm, Arthur V., 4,088,954, Cl. 324-249.000.

Falkner, Raimund. Rope or cable winch. 4,088,306, Cl. 254-187.800.

Fallein, Daryl L. Coupling for joining sections of pipe and method for its use. 4,088,414, Cl. 403-282.000.

Fanshawe, William Joseph; Epstein, Joseph William; Crawley, Lantz Stephen; Hofmann, Corris Mabelle; and Safir, Sidney Robert, to American Cyanamid Company. Acylazabicyclohexanes. 4,088,652, Cl. 260-293.540.

Farge, Daniel: *See*—
Berger, Christian; Farge, Daniel; and Moutonnier, Claude, 4,088,761, Cl. 424-246.000.

Farmer, Everett Walter. Athletic implement with visual range display. 4,088,324, Cl. 273-186.00A.

Farmer, Felta Carl, Jr., to RCA Corporation. Electrical continuity test apparatus having a forward biased diode across the test terminals. 4,088,947, Cl. 324-51.000.

Farnier, Andre. Fluid counter. 4,088,021, Cl. 73-229.000.

Farnier, Andre. Sealing device by capillarity. 4,088,331, Cl. 277-135.000.

Farrell, Robert E., to Package Machinery Company. Mold lockup mechanism. 4,088,432, Cl. 425-451.600.

Fassett, Matthew; Hansen, Russell W.; Toth, John F.; and Ventresca, Pietro, to Raytheon Company. Phase shifter and polarization switch. 4,088,970, Cl. 333-31.00R.

Faust, Raimund Josef, to Hoechst Aktiengesellschaft. Photopolymerizable copying composition. 4,088,498, Cl. 96-115.00P.

Favre, Rene Marc: *See*—
LeCardonnel, Gerard; Gravez, Pierre; and Favre, Rene Marc, 4,088,993, Cl. 340-347.0AD.

Fay, Clifford C.: *See*—
Atkinson, Thomas Carl; and Fay, Clifford C., 4,088,367, Cl. 297-457.000.

Fedor, Robert J.; and Ogden, Cameron S., to Gould Inc. Cobalt base nox reducing catalytic structure. 4,088,606, Cl. 252-465.000.

Felder, Louis; Kirchmayr, Rudolf; and Bellus, Daniel, to Ciba-Geigy Corporation. Initiators for photopolymerization. 4,088,554, Cl. 204-159.150.

Feltner, William R., to United States of America, National Aeronautics and Space Administration. Field effect transistor and method of construction thereof. 4,087,902, Cl. 29-571.000.

Fernandez, William J.: *See*—
Rossi, Albert; and Fernandez, William J., 4,088,589, Cl. 252-56.00R.

Fernley, George W.; and Daane nee Pluim, Gerdina J. R., to Shell Oil Company. Stabilized detergent compositions. 4,088,594, Cl. 252-89.00R.

Ferodo Limited: *See*—
Mellor, Peter Gordon, 4,087,948, Cl. 52-180.000.

Ferrara, William J.: *See*—
Saltzman, Ronald; Ferrara, William J.; and Wasilewski, Olgierd, 4,088,618, Cl. 260-24.000.

Fiat-Allis Construction Machinery, Inc.: *See*—
Drone, Gary Alan, 4,088,209, Cl. 192-13.00R.
Hawk, Dale Wyatt, 4,088,341, Cl. 280-481.000.
Joyce, Hardin, Jr., 4,088,340, Cl. 280-481.000.

Fichet-Bauche: *See*—
Guiraud, Francois, 4,087,995, Cl. 70-299.000.

Fichter, Frederick L.: *See*—
Smith, Irwin M., 4,088,463, Cl. 55-480.000.

Filippov, Vasily Vasilievich: *See*—
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.

Fillman, Russell L.; and Yoon, Young Z., to Woodford Manufacturing Company. Portable dock plate. 4,087,876, Cl. 14-72.500.

Findeisen, Kurt; Wagner, Kuno; Schafer, Walter; and Hennig, Hans Joachim, to Bayer Aktiengesellschaft. Process for the partial carbodiimidization of organic isocyanates. 4,088,665, Cl. 260-453.0AM.

Finley, Donald L.: *See*—
Watson, Robert L.; and Finley, Donald L., 4,088,016, Cl. 73-160.000.

Firmenich S.A.: *See*—
Rautenstrauch, Valentin, 4,088,664, Cl. 260-410.90R.
Smith, Alistair Y.; Dietrich, Paul; and Pickenhagen, Wilhelm, 4,088,649, Cl. 544-385.000.

Fischer, Allen Herbert; and Strauss, James Edgar, to International Telephone and Telegraph Corporation. Fault-closable electrical connector. 4,088,383, Cl. 339-111.000.

Fischer, Paul W.; Holm, LeRoy W.; and Pye, David S., to Union Oil Company of California. Carbon dioxide foam flooding. 4,088,190, Cl. 166-274.000.

Fischer, Paul W.: *See*—
Pyle, Delbert E.; Pye, David S.; and Fischer, Paul W., 4,088,583, Cl. 252-8.50A.

Fischer, Wolfgang: *See*—
Klie, Wolfgang; Hutai, Hubert; and Fischer, Wolfgang, 4,088,357, Cl. 293-98.000.

Fishel, Norman A.; and Gross, David E., to Monsanto Company. Production of thiophenols. 4,088,698, Cl. 260-609.00D.

Fisher, Samuel. Apparatus for de-nesting flanged containers. 4,088,244, Cl. 221-299.000.

Flanner, Philip D., to Systron-Donner Corporation. Linear accelerometer mechanism. 4,088,026, Cl. 73-497.000.

Fleming, Garold Lee: *See*—
White, Allen Andrew; Yatcilla, George; and Fleming, Garold Lee, 4,088,068, Cl. 100-3.000.

Flemming, Karl-Heinz; and Grunewald, Peter, to Wegmann & Co. System for the temporary sealing of the interior of armored vehicles, especially tanks, against the penetration of liquid or gaseous substances. 4,088,058, Cl. 89-36.00K.

Flory, John F., to Exxon Research & Engineering Co. Riser and yoke mooring system. 4,088,089, Cl. 114-230.000.

Flygenring, Eduard Freddy. Needle-valve for hot runner injection moulding. 4,088,271, Cl. 239-533.100.

FMC Corporation: *See*—
Bennington, Robert L.; and Massengale, John T., 4,088,725, Cl. 264-95.000.

Ford Motor Company: *See*—
Hetke, Adolf; and Evans, Walter J., 4,088,477, Cl. 75-130.00R.

Forgione, Albert G.; and Horton, Richard M., to Cyborg Corporation. Method and apparatus for monitoring skin potential response. 4,088,125, Cl. 128-2.10Z.

Foster, Bill D.; Comiskey, John T.; and Degner, LeRoy H., to Elevator Contractors, Inc. Material sampling apparatus. 4,088,025, Cl. 73-423.00R.

Fournier, Yves: *See*—
Mercier, Alain; and Fournier, Yves, 4,088,522, Cl. 156-107.000.

Foxboro Company, The: *See*—
Sgourakes, George E.; and McCullough, Robert C., 4,088,020, Cl. 73-194.0VS.

Fraboni, Gilbert; and Neyroud, Jean, to La Telemecanique Electrique. Frame for printed circuit cards. 4,089,043, Cl. 361-415.000.

Franckowiak, Sigismond: *See*—
Courty, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Sugier, Andre, 4,088,736, Cl. 423-230.000.

Francombe, Maurice H.: *See*—
Wu, Shu-Yau; Bluzer, Nathan; Francombe, Maurice H.; and Jensen, Arthur S., 4,088,546, Cl. 204-15.000.

Frania, Josef; and Lehnert, Erhard, to WABCO Westinghouse G.m.b.H. Brake cylinder with built-in slack adjuster, including means for manually resetting piston travel. 4,088,205, Cl. 188-196.00D.

Frank, Siegfried: *See*—
Ratz, Adolf; Wilhelm, Adolf; Odenwald, Gerhard; Frank, Siegfried; and Stark, Walter, 4,088,047, Cl. 76-112.000.

Franklin, Edna M. Roman style drape pull cord supports. 4,088,170, Cl. 160-84.00R.

Frazier, Clifford John, to Castcraft Industries, Inc. Font fastening means. 4,089,009, Cl. 354-15.000.

Frey, Laverne Lawrence, to Bunker Ramo Corporation. Geared motor assembly. 4,088,910, Cl. 310-89.000.

Fridman, Vladimir Markovich: *See*—
Prigorovsky, Igor Alexandrovich; Ignatiev, Anatoly Denisovich; Shkolnik, Vladimir Emmanuilovich; Khutoretsky, Garri Mikhailovich; Vorontsov, Alexandr Ivanovich; and Fridman, Vladimir Markovich, 4,088,913, Cl. 310-260.000.

Frost, David A.: *See*—
Smalley, Graham; Frost, David A.; and Rothwell, Eric, 4,088,584, Cl. 252-8.55D.

Fuchs, Adolf: *See*—
Schmid, Markus; and Fuchs, Adolf, 4,087,918, Cl. 33-174.00P.

Fuji Photo Film Co., Ltd.: *See*—
Tani, Tadaaki, 4,088,494, Cl. 96-107.000.

Fuji Photo Optical Co., Ltd.: *See*—
Asano, Seiji, 4,089,018, Cl. 354-106.000.

Fuji Plastic Co., Ltd.: *See*—
Tsunemoto, Shiro; Mizuguchi, Teruki; and Hirayama, Eiichi, 4,088,064, Cl. 92-13.600.

Fujiike, Hiroshi: *See*—
Uda, Kazumi; Tamura, Motohiko; Nishiura, Ichiro; and Fujiike, Hiroshi, 4,088,465, Cl. 62-54.000.

Fujimoro, Keizo; and Ohara, Shigeharu, to Nippon Electric Co., Ltd. Rotary-type slice dryer. 4,087,924, Cl. 34-58.000.

Fujisash Industries, Ltd.: *See*—
Yoshioka, Teruo; and Iwanami, Shinichi, 4,088,578, Cl. 210-73.00W.
Fujishiro, Takeshi: *See*—
Kita, Toru; and Fujishiro, Takeshi, 4,088,555, Cl. 204-195.00S.
Fujita, Takeshi: *See*—
Mori, Shigeo; and Fujita, Takeshi, 4,088,614, Cl. 260-2.5AJ.
Fujitsu Fanuc Limited: *See*—
Hashimoto, Yoshihiro; Kawada, Shigeki; Kohari, Katsuo; and Ishida, Hiroshi, 4,088,933, Cl. 318-257.000.
Fujitsu Limited: *See*—
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.
Takezono, Takashi; and Kanie, Takashi, 4,089,063, Cl. 365-200.000.
Fujitsu Ten Limited: *See*—
Tanigawa, Kou; and Ochiai, Takeshi, 4,088,980, Cl. 340-52.00F.
Fujiwara, Kunio: *See*—
Nakahara, Tsuneo; Hoshikawa, Masao; Shiraishi, Satoshi; Kurosaki, Shiro; and Fujiwara, Kunio, 4,088,388, Cl. 350-96.300.
Fukuda, Akira. Air micrometer. 4,088,009, Cl. 73-4.00R.
Fukuda, Yoshihiko; Ishimori, Hidefumi; Toyomatsu, Masafumi; Tsubone, Masayoshi; Mizuguchi, Hideki; and Masuda, Hideo, to Japan Steel Works Ltd., The; and Dai Nippon Toryo Co., Ltd. Die for continuously extruding hollow articles from thermosetting resins. 4,088,434, Cl. 425-467.000.
Funcik, Jack F.: *See*—
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,087,908, Cl. 29-753.000.
Furness, Bernard J., to British Steel Corporation. Optical roll alignment device. 4,088,409, Cl. 356-153.000.
Furukawa, Wataru: *See*—
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu; Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, 4,088,213, Cl. 193-40.000.
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., to Molex Incorporated. Connector harness assembly machine. 4,087,908, Cl. 29-753.000.
G.A.O. Gesselschaft fur Automation und Organisation mbH: *See*—
Pudras, Horst, 4,088,082, Cl. 109-53.000.
G.C. Barnes Tooling and Mfg. Co., Inc.: *See*—
Andrew, Keith V., 4,088,002, Cl. 72-389.000.
Gaba AG: *See*—
Muhlemann, Hans Rudolf; and Schmid, Hans, 4,088,752, Cl. 424-57.000.
Gadelle, Claude; Laloz, Jean-Pierre; and Seree de Roch, Irenee, to Institut Francais du Petrole. Removal of hydrogen arsenide. 4,088,734, Cl. 423-210.000.
Gaines, Larry D., to Phillips Petroleum Company. Ammonia production. 4,088,740, Cl. 423-359.000.
Gallitzendorfer, Josef; Pfeiffer, Peter; Tomforde, Johann; and Gotz, Hans, to Daimler-Benz Aktiengesellschaft. Bar projecting from windshield column of a motor vehicle. 4,088,366, Cl. 296-154.000.
Gallizia, Achille; and Tangorra, Giorgio, to Industrie Pirelli S.p.A. Process for injection molding a tire having a crown and sidewalls of different compositions. 4,088,523, Cl. 156-125.000.
Gallo, Mario: *See*—
Wirth, Armin; Wirth, Johannes; and Gallo, Mario, 4,088,014, Cl. 73-141.00R.
Ganellin, Charon Robin: *See*—
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,088,769, Cl. 424-270.000.
Gant, Orland J., Jr.: *See*—
Howell, Eddie P.; Gant, Orland J., Jr.; Hearn, Daniel P.; and Coffee, Robert D., 4,088,945, Cl. 324-10.000.
Garczynski, John S., to Peripheral Dynamics, Inc. Adaptable mark-/hole sensing arrangement for card reader apparatus. 4,088,265, Cl. 235-454.000.
Gardiner, Frances R.: *See*—
Wood, Louis L.; Murray, Jerome L.; and Gardiner, Frances R., 4,088,132, Cl. 128-285.000.
Gardner-Denver Company: *See*—
Wood, John L.; and Wenrich, Thomas C., 4,088,289, Cl. 248-2.000.
Gardner, Lloyd E.: *See*—
Holtz, Hans D.; and Gardner, Lloyd E., 4,088,823, Cl. 560-236.000.
Garofalo, Giovanni, to AMF Incorporated. Diving mask. 4,087,865, Cl. 2-428.000.
Garrett, Patricia E.: *See*—
Whitesides, George M.; Garrett, Patricia E.; and Siegel, Merrell, 4,088,675, Cl. 260-501.210.
Garrett, Wayne H.; Stringer, Theodore H., III; and Zbikowski, Ted, to Eaton Corporation. Clearance sensing brake adjuster. 4,088,206, Cl. 188-196.00D.
Gasharov, Vihar Assenov: *See*—
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.
Gates, Paul E.; and Kimball, Stephen F., to GTE Sylvania Incorporated. Incandescent lamp having embedded support wires. 4,088,918, Cl. 313-315.000.
Gates, William Ellis: *See*—
Pieters, Wim Johan Meindert; Gates, William Ellis; Carlson, Emery John; and Wilkalis, John Edward, 4,088,705, Cl. 260-653.700.
Gatto, Donald Frederick; Milciunas, Juan; Strobel, William Karl; Krolak, Leo Vincent; and Varasse, Pete, to Motorola, Inc. Housing assembly for miniaturized battery operated electrical apparatus. 4,089,044, Cl. 361-422.000.
Gaughan, Edmund J., to Stauffer Chemical Company. Herbicidal active carboxanilide derivative. 4,088,687, Cl. 260-557.00R.
GEA Kuhturmbau und Systemtechnik Gesellschaft mit Beschrankter Haftung: *See*—
Ruhl, Heinz; and Gilbert, Jean, 4,088,717, Cl. 261-109.000.
Gelder, Richard: *See*—
Ellis, Edric; Gelder, Richard; and Hale, Allan, 4,088,501, Cl. 106-52.000.
Gemind, John M. Device for measuring blood pressure. 4,088,126, Cl. 128-2.05G.
General Atomic Company: *See*—
Cavallaro, Leonardo, 4,088,184, Cl. 165-162.000.
General Dynamics Corporation: *See*—
Regalbuto, John A., 4,088,258, Cl. 228-193.000.
Winderman, Jay B., 4,088,997, Cl. 343-16.00M.
General Electric Company: *See*—
Armstrong, Frederick J.; and Susdorf, Robert A., 4,088,177, Cl. 164-109.000.
Banker, Robert O.; Brown, Charles T.; Ghaem-maghami, Sanjar; Holshouser, Howard E.; and Wachter, Kenneth J., 4,089,025, Cl. 358-10.000.
Bolon, Donald A.; Lucas, Gary M.; and Schroeter, Siegfried H., 4,088,801, Cl. 427-54.000.
Brook, Roger Frederick; and Hein, Paul William, 4,088,888, Cl. 250-445.00T.
Brown, Edgar D., Jr.; and Traver, Frank J., 4,088,591, Cl. 252-75.000.
Carr, Victor H., 4,088,825, Cl. 13-25.000.
Cooper, Glenn Dale; and Watson, James Wilson, Jr., 4,088,634, Cl. 260-47.0ET.
D'Atre, John Douglas; Lipo, Thomas Anthony; and Plunkett, Allan Barr, 4,088,934, Cl. 318-227.000.
D'Atre, John Douglas; and Plunkett, Allan Barr, 4,088,935, Cl. 318-227.000.
Hoeft, Robert F., 4,088,421, Cl. 416-193.00A.
Martin, Jack Reid, 4,088,422, Cl. 416-198.00A.
Mentler, Sandor, 4,089,033, Cl. 361-110.000.
Nopanen, Esko J., 4,088,869, Cl. 219-364.000.
Olges, Laurence T., 4,088,017, Cl. 73-168.000.
Paille, Wilbrod Alfred, 4,087,996, Cl. 72-38.000.
Rabatin, Jacob G., 4,088,894, Cl. 250-483.000.
Schumacher, Frank A.; and Sterling, John E., 4,087,987, Cl. 62-276.000.
Stoner, Jesse A., 4,087,903, Cl. 29-596.000.
General Foods Corporation: *See*—
Katz, Saul N.; Gottesman, Martin; and Haya, Mateo, 4,088,794, Cl. 426-434.000.
General Motors Corporation: *See*—
Arlauskas, Alfonsas; and Loose, Richard D., 4,088,280, Cl. 242-107.000.
Bodem, Roy C., 4,088,035, Cl. 74-70.000.
Doller, John S.; and Kitchin, Oscar G., 4,088,211, Cl. 192-45.000.
Kramer, Richard L., 4,088,858, Cl. 200-61.270.
Thornburgh, William F., 4,087,965, Cl. 60-277.000.
Winchell, Frank J.; Winkelmann, Klaus O.; Mrlik, Jerry R.; Denzer, Richard E.; and Williams, Jerry K., 4,088,338, Cl. 280-220.000.
Woodruff, William C.; Lombardo, Dennis M.; and Horrell, Theodore H., Jr., 4,088,109, Cl. 123-179.00H.
General Signal Corporation: *See*—
Bachle, Walter W., 4,088,327, Cl. 277-11.000.
General Steel Industries, Inc.: *See*—
Jackson, Keith L., 4,088,080, Cl. 105-136.000.
General Tire & Rubber Company, The: *See*—
Gowetski, Michael; and Smith, Robert W., 4,088,525, Cl. 156-173.000.
Gentz, Paul. Spray apparatus for toilet. 4,087,868, Cl. 4-7.000.
Geosource Inc.: *See*—
Lockett, James F., 4,088,227, Cl. 209-111.600.
Gerchikov, Leonid Nikonovich: *See*—
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.
Gergen, William P.; and Davison, Sol, to Shell Oil Company. Multicomponent polysulfone-block copolymer-polymer blends. 4,088,626, Cl. 260-42.180.
Gergen, William P.; and Davison, Sol, to Shell Oil Company. Multicomponent polyurethane-block copolymer blends. 4,088,627, Cl. 260-42.180.
Gergen, William P.; and Davison, Sol, to Shell Oil Company. Polycarbonate/block copolymer blend. 4,088,711, Cl. 260-873.000.
Geronime, Robert L., to Rosemount Inc. Capacitive load cell. 4,089,036, Cl. 361-283.000.

Ghaem-maghami, Sanjar: *See*—
Banker, Robert O.; Brown, Charles T.; Ghaem-maghami, Sanjar; Holshouser, Howard E.; and Wachter, Kenneth J., 4,089,025, Cl. 358-10.000.
Giallorenzi, Thomas G.: *See*—
Crowley, James D.; Weller, Joseph F.; and Giallorenzi, Thomas G., 4,088,969, Cl. 333-30.00R.
Gibson, Thomas P. Glider. 4,087,934, Cl. 46-81.000.
Gichard, F. Daric: *See*—
Hernandez, E. Norman; and Gichard, F. Daric, 4,088,027, Cl. 73-517.00B.
Gierla, Joyce, to Lawrence Peska Associates, Inc., a part interest. Portable tennis court. 4,088,317, Cl. 273-31.000.
Giglia, Robert Domenico, to American Cyanamid Company. Paper counter-electrode for electrochromic devices. 4,088,395, Cl. 350-357.000.
Gilbert, Jean: *See*—
Ruhl, Heinz; and Gilbert, Jean, 4,088,717, Cl. 261-109.000.
Giles, Richard F., to Phillips Petroleum Company. Automatic control of extrusion. 4,088,430, Cl. 425-144.000.
Gillentine, Donald O., to Rockwell International Corporation. Adjustable hinge. 4,087,885, Cl. 16-146.000.
Gillette, Roger B.: *See*—
United States of America, National Aeronautics and Space Administration; Shannon, Roger L.; and Gillette, Roger B., 4,088,926, Cl. 315-111.200.
Gillette, Willard D., to Zephyr Wind Dynamo Company. Transmitting torque. 4,087,990, Cl. 64-2.00P.
Gilmour, George A., to Westinghouse Electric Corp. Synthetic aperture side-looking sonar system. 4,088,978, Cl. 340-3.00R.
Gingher, George C., Jr., to Bethlehem Steel Corporation. System for controlling the flow of sinter to blast furnace. 4,088,308, Cl. 266-90.000.
Giorgi, Tiziano A.; and della Porta, Paolo, to S.A.E.S. Getters S.p.A. Vacuum pumping system and method of use. 4,088,456, Cl. 55-179.000.
Girt, Keith Harry: *See*—
Robinson, Frank; Girt, Keith Harry; and Whatmough, Nigel Stephen, 4,087,991, Cl. 66-189.000.
Givaudan Corporation: *See*—
Sigg-Grutter, Trudi; and Wild, Jost, 4,088,688, Cl. 260-586.00D.
Glenn, Eldridge Myles: *See*—
Callahan, William A.; Glenn, Eldridge Myles; and Rector, Douglas L., 4,088,766, Cl. 424-263.000.
Glory Kogyo Kabushiki Kaisha: *See*—
Kinoshita, Yoshio; and Iguchi, Masayuki, 4,088,873, Cl. 235-92.0AC.
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; by Magidson, Galina Konstantinovna; and by Magidson, July Onisimovich, administrators. Pyrazino (1,2,3-ab)-β-carboline derivatives and salts thereof and method of preparing same. 4,088,647, Cl. 544-343.000.
Godard, Dominique Noel; and Milewski, Andrzej Tadeusz, to International Business Machines Corporation. Carrier detector. 4,088,833, Cl. 178-88.000.
Godel, Albert Andre, to Compagnie Industrielle de Procedes & d'Applications S.A. Self-agglomerating fluidized bed reacting process. 4,088,745, Cl. 423-659.000.
Godfrey, John N., to Olin Corporation. Method for imparting gauge variations to improve roll formation in regenerated cellulose film. 4,088,728, Cl. 264-167.000.
Godfrey, Marl D.: *See*—
Miller, Bradley W.; Hickenlooper, Franklin T.; Uhlrich, David C.; Godfrey, Marl D.; Clifford, Douglas M.; James, Rex L.; Watson, Robert E.; Keith, John C.; and Mortensen, Alan C., 4,089,059, Cl. 364-706.000.
Goguillot, Claude. Drawing table with a telescopic arm. 4,087,916, Cl. 33-76.00R.
Gold, Elijah H., to Schering-Corporation. N-Acyl-3-azetidinone. 4,088,644, Cl. 260-239.00A.
Goldish, Milton; and Evenson, Arthur Edward. Batteryless ohmmeter. 4,088,949, Cl. 324-62.000.
Goldstein, Bernard: *See*—
Dresner, Joseph; and Goldstein, Bernard, 4,088,510, Cl. 148-6.300.
Golobay, Gary L., to J. I. Case Company. Vibratory plow. 4,087,982, Cl. 61-72.600.
Gomm, Walter; and Beecken, Hermann, to Bayer Aktiengesellschaft. Process for the preparation of styryl dyestuffs. 4,088,673, Cl. 260-465.00E.
Gonsalves, Richard: *See*—
Kerr, Leo A.; Sinsky, Allen I.; and Gonsalves, Richard, 4,089,002, Cl. 343-11.00R.
Goode, Frederick R., to International Harvester Company. Transmission disconnect system. 4,088,208, Cl. 192-4.00A.
Goodlaxson, John D., to Maytag Company, The. Centrifugal pump with means for precluding airlock. 4,087,994, Cl. 68-23.700.
Goodnight, Kenneth C., Jr.; and Hartman, Grant H., Jr., to Mead Johnson & Company. Low carbohydrate oilseed lipid-protein comestible. 4,088,795, Cl. 426-598.000.
Goodyear Tire & Rubber Company, The: *See*—
Anderson, John E.; and Burkholder, Ward J., 4,088,699, Cl. 260-610.00B.
Apicella, Anthony M., Jr., 4,088,721, Cl. 264-40.400.
Kimball, Michael E., 4,088,636, Cl. 260-77.5AM.
Mowdood, Syed K., 4,088,631, Cl. 260-45.9NC.
Gorman, Thomas G.: *See*—
Dulin, Patrick J.; Gorman, Thomas G.; Robb, Neil E.; and Wickham, Robert G., 4,088,423, Cl. 416-210.00R.
Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, to Sugai Chemical Industry Company Limited. Process for preparing o-phenylphenol. 4,088,702, Cl. 568-747.000.
Gott, Stephen P., to Citibank N.A. Automated data entry and display system. 4,088,981, Cl. 340-146.3SY.
Gottesman, Martin: *See*—
Katz, Saul N.; Gottesman, Martin; and Haya, Mateo, 4,088,794, Cl. 426-434.000.
Gottlieb, Milton: *See*—
Jones, Charles H.; and Gottlieb, Milton, 4,088,979, Cl. 340-5.00H.
Gotz, Hans: *See*—
Gallitzendorfer, Josef; Pfeiffer, Peter; Tomforde, Johann; and Gotz, Hans, 4,088,366, Cl. 296-154.000.
Gould Inc.: *See*—
Fedor, Robert J.; and Ogden, Cameron S., 4,088,606, Cl. 252-465.000.
Kussy, Frank W.; Dimarco, Bernard; Kralik, Andrew J.; and Krueger, Keith T., 4,088,973, Cl. 335-6.000.
Shemtov, Sami, 4,088,348, Cl. 285-184.000.
Gowetski, Michael; and Smith, Robert W., to General Tire & Rubber Company, The. Method of making fiber glass parts with stud supports. 4,088,525, Cl. 156-173.000.
Gradert, Arno, to O & K Orenstein & Koppel Aktiengesellschaft. Winch system control mechanism for the simultaneous control of two winch motors. 4,088,304, Cl. 254-184.000.
Grahl, Darwin R., to Parker-Hannifin Corporation. Control valve. 4,087,986, Cl. 62-189.000.
Granone, Charles J. Punch. 4,087,912, Cl. 30-366.000.
Gravez, Pierre: *See*—
LeCardonnel, Gerard; Gravez, Pierre; and Favre, Rene Marc, 4,088,993, Cl. 340-347.0AD.
Gravisse, Philippe Edouard. Amplifying device of radiant energy. 4,088,508, Cl. 136-89.0HY.
Grawinger, Otto: *See*—
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,088,764, Cl. 424-251.000.
Gray, Frederick W.: *See*—
Kenkare, Divaker B.; Gray, Frederick W.; and Shumway, Durland K., 4,088,751, Cl. 424-47.000.
Gray, Theodore F., Jr.: *See*—
Seymour, Robert W.; Weaver, James C.; and Gray, Theodore F., Jr., 4,088,709, Cl. 260-860.000.
Graybill, Clinton. Variable venturi carburetor. 4,088,715, Cl. 261-36.00A.
Gre, Michel Jean, to Rhone-Poulenc-Textile. Machine for manufacture of a cable from single wires. 4,087,956, Cl. 57-58.540.
Greb Industries Limited: *See*—
Norton, Ian F.; and Beekenkamp, Gerald, 4,088,335, Cl. 280-11.180.
Green, Robert E. Capacitive transistorized signaling device. 4,088,904, Cl. 307-308.000.
Grehl, William H., to O. F. Mossberg & Sons, Inc. Magazine cap retaining means for tubular magazine firearms. 4,087,930, Cl. 42-75.00B.
Grey, Donald M.: *See*—
Zipser, Randall E.; Butler, Gene R.; and Grey, Donald M., 4,088,231, Cl. 214-6.00B.
Grieshaber, Herman R.; and Wilkinson, Jack E. Tool cleaning device. 4,087,878, Cl. 15-111.000.
Griffin, Phil Harmon: *See*—
Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, 4,088,457, Cl. 55-194.000.
Grigoletti, Giorgio, to Ing. C. Olivetti & C., S.p.A. Arrangement for retrieving information recorded on a semi-random access record carrier. 4,089,027, Cl. 360-72.000.
Grigoraschenko, Vladimir Alexandrovich: *See*—
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.
Grillot, Homer N., to International Harvester Company. Bale loader and shredder. 4,088,272, Cl. 241-30.000.
Grohoski, Edward Gregory, to Hartford Special Machinery Company, The. Planetary work forming machine having improved starter timing control and starter drive selector. 4,088,045, Cl. 74-813.00C.
Groom, Nelson J.: *See*—
Anderson, Willard W.; and Groom, Nelson J., 4,088,018, Cl. 73-178.00R.
Groome, Ernest J., to Clupak, Inc. Method of softening nonwoven fabrics. 4,088,731, Cl. 264-282.000.
Gross, David E.: *See*—
Fishel, Norman A.; and Gross, David E., 4,088,698, Cl. 260-609.00D.
Gross, Franz, to Siemens Aktiengesellschaft. Delay line for travelling-wave tubes. 4,088,924, Cl. 315-3.500.
Gross, Friedrich: *See*—
Beck, Theodor; and Gross, Friedrich, 4,088,789, Cl. 426-9.000.
Grossman, Morris Gary: *See*—
Breslau, Steven M.; Grossman, Morris Gary; and Levy, Edward D., 4,087,926, Cl. 34-70.000.

Groves, Charles L., Jr.: *See—*
Podolsky, Leaman B.; Groves, Charles L., Jr.; and Johnson, Steven J., 4,088,875, Cl. 364-494.000.

Gruber, Werner: *See—*
Woog, Heinrich; Gruber, Werner; and Rothe, Werner, 4,088,759, Cl. 424-240.000.

Gruden, Dusan, to Porshce AG. Mixture compressing, external auto-ignition four-stroke cycle internal combustion engine. 4,088,099, Cl. 123-75.00B.

Grunberger, Arno. School book back satchel. 4,088,252, Cl. 224-8.00R.

Grundman, Lea, to Rafa Laboratories Ltd. Composition and method for determination of pregnancy. 4,088,749, Cl. 424-12.000.

Gruner, Ronald Hans, to Data General Corporation. Data processing system. 4,089,052, Cl. 364-200.000.

Grunewald, Peter: *See—*
Flemming, Karl-Heinz; and Grunewald, Peter, 4,088,058, Cl. 89-36.00K.

GTE Automatic Electric Laboratories Incorporated: *See—*
Torburn, Roy B., 4,089,042, Cl. 361-412.000.

GTE Laboratories Incorporated: *See—*
Kim, Han J.; Reid, F. Joseph; and Scimeca, Frederick J., 4,088,480, Cl. 75-200.000.
Meslener, George J., 4,088,885, Cl. 250-199.000.
Zucker, Joseph; and Lauer, Robert, 4,088,389, Cl. 350-96.150.

GTE Sylvania Incorporated: *See—*
Ashley, Albert H., 4,088,961, Cl. 330-53.000.
Gates, Paul E.; and Kimball, Stephen F., 4,088,918, Cl. 313-315.000.
Kirby, Thomas J., 4,088,950, Cl. 324-95.000.
Layman, H. David; and Minner, Henry B., 4,088,921, Cl. 313-467.000.
Staley, James G., 4,088,972, Cl. 318-532.000.
Wolfe, Robert W., 4,088,922, Cl. 313-486.000.

Gubisch, Erwin; Kudlich, Walter; Popp, Walter; and Reinicke, Herbert, to Wacker Chemie GmbH. Process for the production of a pulverulent, tricklable mixture of ethylene/vinyl acetate copolymer and powdery polyvinylchloride. 4,088,625, Cl. 260-42.000.

Guest, Manuel T. Hose connection employing relatively slidable parts. 4,088,349, Cl. 285-255.000.

Guildford, Allen John: *See—*
McLoughlin, Bernard Joseph; and Guildford, Allen John, 4,088,814, Cl. 542-455.000.

Guiraud, Francois, to Fichet-Bauche. Combination lock. 4,087,995, Cl. 70-299.000.

Gulf Research & Development Company: *See—*
Kobylinski, Thaddeus P., 4,088,671, Cl. 260-449.60R.

Gulf & Western Manufacturing Company: *See—*
Solomon, Elias E., 4,088,989, Cl. 340-274.00R.

Gumb, Beverley William, to Northern Telecom Limited. Adaptor for plug-in telephones. 4,088,384, Cl. 339-156.00R.

Gumen, Valery Fedorovich; Kalininskaya, Tatyana Vasilievna; Loparev, Robert Nikolaevich; and Sladkov, German Vladimirovich. Photoelectric position sensor of step motor. 4,088,908, Cl. 310-49.00R.

Gundzik, Richard M.: *See—*
Choi, Charles K.; Gundzik, Richard M.; and Tassoney, Joseph P., 4,088,541, Cl. 202-99.000.

Gunther, Arno: *See—*
Slazas, John J.; and Gunther, Arno, 4,087,970, Cl. 60-487.000.

Gupta, Shanti S.; Bhatnagar, Vijaya K.; and Litster, John F., to Wescom, Inc. Digital echo suppressor. 4,088,851, Cl. 179-170.200.

Gurkov, Konstantin Stepanovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.

Gurney, Richard S., to H. B. Fuller Company. Method of marking paved surfaces and curable two-part epoxy systems therefor. 4,088,633, Cl. 260-47.0EN.

Gute, Robert M., to Midland-Ross Corporation. Air pressure brake arrangement for tractor and semi-trailer combinations. 4,088,374, Cl. 303-9.000.

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Gurney, Richard S., 4,088,633, Cl. 260-47.0EN.

H-C Industries Inc.: *See—*
Wilde, Sheldon L., 4,088,730, Cl. 264-268.000.

H R B Tooling AB: *See—*
Severinsson, Lars Magnus, 4,088,046, Cl. 76-107.00R.

H. R. Turner (Willenhall) Ltd.: *See—*
Pallant, Joseph; and Johndrow, John Paul, 4,088,378, Cl. 308-3.00R.

Haas, Frank J., to Burroughs Corporation. Document processing, character reading apparatus. 4,088,982, Cl. 340-146.3ED.

Habu, Teiji; Korematsu, Shinobu; Wada, Tsuneo; Omura, Takayosi; Ishii, Hiroki; and Sasaki, Takashi, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic element containing a gelatinous layer hardened with an aliphatic hydrocarbon having at least three vinylsulfonyl groups. 4,088,495, Cl. 96-111.000.

Haferl, Peter Eduard, to RCA Corporation. Pincushion correction circuit. 4,088,931, Cl. 315-371.000.

Hafke, Carl: *See—*
Kohlen, Rudolf; Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, 4,088,455, Cl. 48-202.000.

Hagar, Donald K. Apparatus and method for sealing dampers. 4,088,146, Cl. 137-1.000.

Hager, Clarence H., to Modern Suspension Systems, Inc. Curling die apparatus. 4,087,998, Cl. 72-166.000.

Hager & Elsaesser: *See—*
Marquardt, Kurt, 4,088,563, Cl. 210-33.000.

Hager, James R., to Brunswick Corporation. Multiple capacitor means ignition system. 4,088,108, Cl. 123-148.0CC.

Hager, Walter, to Pfaff Industriemaschinen GmbH. Sewing device for producing form seams. 4,088,085, Cl. 112-121.120.

Haisman, Derek Robin: *See—*
Bevan, David William; Clarke, Michael Willam; Haisman, Derek Robin; and Pendlington, Sydney, 4,088,790, Cl. 426-96.000.

Hakim, Mehmood Abdulhameed; and Bysouth, Peter Thomas, to BDH Pharmaceuticals Limited. 6-(p-piperazino)-phenyl-4,5-dihydro-3(2H)pyridazinones. 4,088,762, Cl. 424-250.000.

Hale, Allan: *See—*
Ellis, Edric; Gelder, Richard; and Hale, Allan, 4,088,501, Cl. 106-52.000.

Hall, Floyd Van, to Liggett & Myers Incorporated. Method and apparatus for making tobacco smoke filter. 4,088,065, Cl. 93-1.00C.

Hall, John F.; MacDonald, Donald C.; and Holliday, Frank R., to Chrysler Corporation. Impact resistant seal for gasoline tank. 4,088,241, Cl. 220-86.00R.

Hall, Ralph R.: *See—*
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Hammann, Ingeborg: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; and Hammann, Ingeborg, 4,088,758, Cl. 424-212.000.

Hans Olssons Mekaniska Verkstad AB: *See—*
Olsson, Hans, 4,088,048, Cl. 83-55.000.

Hansen Manufacturing Company, The: *See—*
Alferes, Ernest, 4,088,436, Cl. 431-21.000.

Hansen, Russell W.: *See—*
Fassett, Matthew; Hansen, Russell W.; Toth, John F.; and Ventresca, Pietro, 4,088,970, Cl. 333-31.00R.

Hansford, Rowland C.: *See—*
Hass, Robert H.; Hansford, Rowland C.; and Hennig, Harvey, 4,088,743, Cl. 423-539.000.

Hara, Tohru; Mihara, Minoru; and Toyoda, Nobuyuki, to Matsushita Electric Industrial Co., Ltd. Method for epitaxial growth of thin semiconductor layer from solution. 4,088,514, Cl. 148-171.000.

Hara, Toshito: *See—*
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.

Haraikawa, Tetsuo, to Tokico Ltd. Mechanical disc brake including floating actuator. 4,088,204, Cl. 188-71.700.

Hard, Harold D., to MAP Corporation, The. Combination gauge shield and lock pin for a fire extinguisher. 4,088,194, Cl. 169-75.000.

Hareng, Michel: *See—*
Assouline, Georges; Hareng, Michel; Roncillat, Michel; and Leiba, Eugene, 4,088,400, Cl. 353-20.000.

Hari, Stefan; Muller, Rolf; and Mory, Rudolf, to Ciba-Geigy Corporation. 4-Methyl-5-(benzimidazolonylazo)-6-hydroxypyridone-2 pigment. 4,088,641, Cl. 260-156.000.

Harkki, Seppo Untamo: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.

Harman, Stephen George, to Northern Telecom Limited. Split-ring digital phase modulator. 4,088,967, Cl. 332-23.00R.

Harnett, Herbert Martin, to Bunker Ramo Corporation. Interconnector. 4,088,381, Cl. 339-94.00A.

Harr, Ewald. Piston power generating machine. 4,088,033, Cl. 74-25.000.

Harrell, John W.: *See—*
Patton, Bobbie J.; and Harrell, John W., 4,088,154, Cl. 138-30.000.

Harrington, Anne E.: *See—*
Tutein, Thomas R.; Harrington, Anne E.; and Jacob, Jose T., 4,088,600, Cl. 252-344.000.

Harris, Alva F.; and Azevedo, Maximino S., to Monsanto Company. 1,4-Cyclohexadiene compounds used as chain transfer agents in nitrile polymerization. 4,088,811, Cl. 526-89.000.

Harris, Robert H. Construction methods. 4,087,946, Cl. 52-105.000.

Hart Chemical Limited: *See—*
Shane, Hugh J. S.; and Schell, Frederick S., 4,088,601, Cl. 252-358.000.

Hart, William Barrie, to Delta Materials Research Limited. Devices and methods for converting heat energy to mechanical energy. 4,087,971, Cl. 60-527.000.

Hartford Special Machinery Company, The: *See—*
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Hartig, Gunter Fritz. Pulse sequence generator. 4,088,874, Cl. 235-92.0DE.

Hartman, Grant H., Jr.: *See—*
Goodnight, Kenneth C., Jr.; and Hartman, Grant H., Jr., 4,088,795, Cl. 426-598.000.

Hartnell, Freeman H., to Corning Glass Works. Package. 4,088,225, Cl. 206-419.000.

Hasegawa, Hiroshi; Ohtsubo, Yoshiaki; Watanabe, Sakuji; and Takahata, Kouichi. deceased (by Takahata, Kosaku, legal successor), to Nippon Kogaku K.K. Flashlight information signal generating device for a camera. 4,089,013, Cl. 354-33.000.

Hashimoto, Yoshihiro; Kawada, Shigeki; Kohari, Katsuo; and Ishida,

Hiroshi, to Fujitsu Fanuc Limited. DC Motor phase control system. 4,088,933, Cl. 318-257.000.

Hasquenoph, Jean H.; and Coutin, Pierre F., to R. Alkan & Cie. Dual-purpose ejector for aircraft load jettisoning mechanism. 4,088,287, Cl. 244-137.00R.

Hass, Robert H.; Hansford, Rowland C.; and Hennig, Harvey, to Union Oil Company of California. Catalytic incineration of hydrogen sulfide from gas streams. 4,088,743, Cl. 423-539.000.

Hasslinger, Russell; and Pickering, Keldon S., to American Velcro Inc. Separable fastener for catheter tubes and the like. 4,088,136, Cl. 128-349.00R.

Hata, Shigeki: *See*—
Matsumura, Yasuhiro; and Hata, Shigeki, 4,088,909, Cl. 310-49.00R.

Hatae, Masataka: *See*—
Sata, Takeo; Takamura, Masayuki; Shinoda, Norio; and Hatae, Masataka, 4,087,893, Cl. 29-157.30A.

Hattori, Hiroyuki: *See*—
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,088,872, Cl. 235-91.00R.

Hauge, Douglas Oliver, to United States Gypsum Company. Process for producing phosphoric acid using mixed acid feed and a dicalcium phosphate intermediate. 4,088,738, Cl. 423-319.000.

Hausleithner, Andreas. Release binding for skis. 4,088,342, Cl. 280-614.000.

Hausleithner, Andreas. Ski boot heel release binding for skis. 4,088,344, Cl. 280-626.000.

Hawk, Dale Wyatt, to Fiat-Allis Construction Machinery, Inc. Vehicle coupling system. 4,088,341, Cl. 280-481.000.

Hawk, Robert M., to Corning Glass Works. Optical waveguide connector using resilient material and V-groove. 4,088,386, Cl. 350-96.210.

Haya, Mateo: *See*—
Katz, Saul N.; Gottesman, Martin; and Haya, Mateo, 4,088,794, Cl. 426-434.000.

Hayashi, Yuji: *See*—
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.

Hayes-Albion Corporation: *See*—
Dulin, Patrick J.; Gorman, Thomas G.; Robb, Neil E.; and Wickham, Robert G., 4,088,423, Cl. 416-210.00R.

Hayman, Robert A., to United States of America, Army. Firing circuit. 4,088,075, Cl. 102-70.20R.

Hayner, Paul F., to Sanders Associates, Inc. Method and apparatus for controlling and utilizing recoil. 4,088,059, Cl. 89-43.00A.

Haynie, Cyrus C.: *See*—
United States of America, National Aeronautics and Space Administration; Zebus, Paul P.; Packer, Poley N.; and Haynie, Cyrus C., 4,088,312, Cl. 269-21.000.

Hazart, Jean P. M.: *See*—
Bourg, Andre; Hazart, Jean P. M.; and Jouret, Jacques Y., 4,088,470, Cl. 65-105.000.

Hearn, Daniel P.: *See*—
Howell, Eddie P.; Gant, Orland J., Jr.; Hearn, Daniel P.; and Coffee, Robert D., 4,088,945, Cl. 324-10.000.

Heath, Jesse M. Device and method for forming a structure, and a structure formed thereby. 4,088,719, Cl. 264-30.000.

Heberlein Textildruck AG: *See*—
Leimbacher, Erwin; Siegrist, Otto; and Steiger, Alfred, 4,088,440, Cl. 8-2.50A.

Hecht, Jeffrey K.: *See*—
Czerepinski, Ralph G.; Hecht, Jeffrey K.; and Chiu, Thomas T., 4,088,482, Cl. 96-1.50R.

Hedrick, W. David. String instrument tuning apparatus. 4,088,052, Cl. 84-454.000.

Heilemann, Otto: *See*—
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Hein, Paul William: *See*—
Brook, Roger Frederick; and Hein, Paul William, 4,088,888, Cl. 250-445.00T.

Heinsohn, Howard H., Jr.: *See*—
Evers, William J.; and Heinsohn, Howard H., Jr., 4,088,697, Cl. 260-609.00R.

Heinz, Harro K.: *See*—
Thurmond, George R.; and Heinz, Harro K., 4,088,835, Cl. 179-1.0FS.

Heisner, Donald N.; and Bentivegna, Charles R., to Monsanto Company. Tire inspection system. 4,088,936, Cl. 318-626.000.

Heitmann, Jurgen: *See*—
Wilhelm, Rudolf; and Heitmann, Jurgen, 4,089,026, Cl. 358-10.000.

Helgesson, Claes Ivar, to Arbman Development AB. Method and apparatus for biological purification. 4,088,571, Cl. 210-17.000.

Helliwell, John Fielden: *See*—
Carter, Malcolm Nigel Alan; McGhee, Brian; Helliwell, John Fielden; Marshall, John Kerr; and Naik, Appayya Raghunath, 4,088,612, Cl. 252-545.000.

Helton, Eugene L.; and Simmons, Gerald P., to Caterpillar Tractor Co. Spherical shot producing machine. 4,088,429, Cl. 425-8.000.

Hemphill, Kent W.: *See*—
Rees, James D.; and Hemphill, Kent W., 4,088,401, Cl. 353-122.000.

Hengen, Edward John: *See*—
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Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA): *See*—
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,088,593, Cl. 252-89.00R.

Hennig, Hans Joachim: *See*—
Findeisen, Kurt; Wagner, Kuno; Schafer, Walter; and Hennig, Hans Joachim, 4,088,665, Cl. 260-453.0AM.

Hennig, Harvey: *See*—
Hass, Robert H.; Hansford, Rowland C.; and Hennig, Harvey, 4,088,743, Cl. 423-539.000.

Henthorn, Donald R.: *See*—
Watling, Leighton Harvey; and Henthorn, Donald R., 4,088,008, Cl. 72-481.000.

Heraeus Elektroden GmbH: *See*—
Fabian, Peter; Jedlitschka, Ernst; Krebs, Helmut; and Simon, Heinrich, 4,088,558, Cl. 204-288.000.

Herchenbach, Horst: *See*—
Deussner, Herbert; Ramesohl, Hubert; and Herchenbach, Horst, 4,088,438, Cl. 432-106.000.

Herman, Richard Michael; and Batiuk, Martin, to B. F. Goodrich Company, The. Thermoplastic polymer blends comprising EPDM and EP. 4,088,713, Cl. 260-897.00A.

Hermann, Walter; Kuehl, Burkhart; and Schuck, Wolf Dieter, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Flat high frequency cable useable with vehicle transmitter-receiver. 4,088,971, Cl. 333-84.00R.

Hernandez, E. Norman; and Gichard, F. Daric. Force balance servo accelerometer. 4,088,027, Cl. 73-517.00B.

Herrmann, Frank P., to Precision Industries, Inc. Steel door construction. 4,087,942, Cl. 49-501.000.

Herron, Charles R.: *See*—
LeBegue, Maurice K.; and Herron, Charles R., 4,088,371, Cl. 299-76.000.

Herzog, Raymond A., to Cincinnati Butchers' Supply Co., The. Combination rail, conveyor chain and return hanger. 4,088,079, Cl. 104-111.000.

Hesston Corporation: *See*—
White, Allen Andrew; Yatcilla, George; and Fleming, Garold Lee, 4,088,068, Cl. 100-3.000.

Hetke, Adolf; and Evans, Walter J., to Ford Motor Company. Sheathless wire feeding of alloy and inoculant materials. 4,088,477, Cl. 75-130.00R.

Hettich, Alfred: *See*—
Roll, Karl; Hettich, Alfred; Stahl, Hubert; and Keil, Werner, 4,088,197, Cl. 173-12.000.

Heves Megyei Tanacsi Epitoipari Vallalat: *See*—
Kocsanyi, Laszlo; Varga, Lajos; Kovacs, Marton; Takats, Ferenc; and Kalo, Gyorgy, 4,088,579, Cl. 210-82.000.

Hewlett-Packard Company: *See*—
Miller, Bradley W.; Hickenlooper, Franklin T.; Uhlrich, David C.; Godfrey, Marl D.; Clifford, Douglas M.; James, Rex L.; Watson, Robert E.; Keith, John C.; and Mortensen, Alan C., 4,089,059, Cl. 364-706.000.

Hibi, Masao: *See*—
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, 4,088,391, Cl. 350-150.000.

Hickenlooper, Franklin T.: *See*—
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Hickman, Ronald J., to Stewart-Warner Corporation. Engine starting aid. 4,088,247, Cl. 222-180.000.

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Hight, Henry Delmar, Jr., to Martin Concrete Engineering Company. Automatic rib breaker. 4,088,112, Cl. 125-2.000.

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Hill, William Frank, to Lucas Electrical Company Limited, The. Circuit for recognizing a pulse waveform and an ignition system for an i.c. engine including such a circuit. 4,088,901, Cl. 307-236.000.

Hillman, Darrel D., to Electromatic Drive Corporation. Power drive transmission assembly. 4,088,036, Cl. 74-230.17A.

Hilti Aktiengesellschaft: *See*—
Lippacher, Wolfgang; Deutschenbaur, Paul; and Teger, Gerhard, 4,088,054, Cl. 85-84.000.

Hilty, Jon D. Automatic system cleaner for remote monitor. 4,088,575, Cl. 210-64.000.

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Hirano, Masao, to Omron Tateisi Electronics Co. Field effect mode liquid crystal display materials. 4,088,393, Cl. 350-350.000.

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Ohba, Shintaro; Hirose, Nobuhiko; Sugihara, Nobuhiro; and Aikawa, Takayuki, 4,087,889, Cl. 24-129.00W.
Hirsch, William A. Washer attachment for a vehicle headlight. 4,088,358, Cl. 239-284.00A.
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Kondo, Hiroyuki; Nitta, Takahisa; and Moriguchi, Yoshiro, 4,088,516, Cl. 148-187.000.
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Okuyama, Toshiaki; and Kubota, Yuzuru, 4,088,932, Cl. 318-138.000.
Sato, Naonobu; and Shinnou, Kaoru, 4,089,021, Cl. 357-20.000.
Suzuki, Teruki; Tanimizu, Shinkichi; and Ohno, Yukio, 4,088,599, Cl. 252-301.40F.
Tanaka, Tomoyuki, 4,089,024, Cl. 357-38.000.
Yabuki, Takashi; Shidara, Naohiro; and Kimura, Tomoaki, 4,088,179, Cl. 164-441.000.
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Bhat, Sujata Vasudev; de Souza, Noel John; Dornauer, Horst; Bhattacharya, Bani Kanta; and Dohadwalla, Alihusein Nomanbhai, 4,088,659, Cl. 260-345.200.
Faust, Raimund Josef, 4,088,498, Cl. 96-115.00P.
Kleiner, Hans-Jerg, 4,088,677, Cl. 260-502.40R.
Knoblauch, Wolfgang; Mucke, Rainer; and Salvador, Rene, 4,088,590, Cl. 252-73.000.
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Lederer, Michael; and Strobel, Wolfgang, 4,088,712, Cl. 260-878.00R.
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Siegemund, Gunter; and Muschaweck, Roman, 4,088,701, Cl. 260-614.00F.
Hoeft, Robert F., to General Electric Company. Coverplate damping arrangement. 4,088,421, Cl. 416-193.00A.
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Hofen, Willi; Prescher, Gunter; Siekmann, Gerd; and Wolf, Gunter, to Bayer Aktiengesellschaft; and Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the preparation of organic solutions of percarboxylic acids. 4,088,676, Cl. 260-502.00R.
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Hoff, Stephen J., 4,088,210, Cl. 192-17.00D.
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Chan, Ka-Kong; and Saucy, Gabriel, 4,088,662, Cl. 260-404.000.
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Holstius, Elvin A.: *See—*
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Holtz, Hans D.; and Gardner, Lloyd E., to Phillips Petroleum Company. Promoted liquid phase oxidation of alkyl aromatic compounds. 4,088,823, Cl. 560-236.000.
Holzapfel, Immanuel, to Daimler-Benz Aktiengesellschaft. Combustion chamber. 4,088,437, Cl. 431-161.000.
Holzrichter, Edward Julius, to Whittaker Corporation. Water-dispersible, polyester-based coatings formulations and method of making same. 4,088,619, Cl. 260-29.40R.
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Johnson, Charles A., 4,088,519, Cl. 156-73.100.
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Homme, Arthur C., Jr., to Allied Chemical Corporation. Contact sulfuric acid process employing double conversion/double absorption. 4,088,742, Cl. 423-522.000.
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Takahashi, Noriyuki; and Nishikawa, Masao, 4,087,969, Cl. 60-464.000.
Honeywell Inc.: *See—*
Jourdan, Paul I., 4,088,458, Cl. 55-197.000.
Hooker, Marvin L., Jr., to Rockwell International Corporation. Radar signal processor. 4,088,996, Cl. 343-5.0VQ.
Hooper, Joel Ray. Magnetic holding apparatus and methods of constructing and utilizing same. 4,088,254, Cl. 224-45.00R.
Hope, Henry F.; and Hope, Stephen F. Wind operated power plant. 4,088,419, Cl. 415-2.000.
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Smith, R. Lowell; Logan, J. Douglas; and Kendall, Michael P., 4,088,891, Cl. 250-315.00R.
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Howard, Curtis E.; and Calvin, Douglas G., to Texaco Inc. Well steam sampler apparatus and method of forming and using a well steam sampler. 4,088,187, Cl. 166-264.000.
Howard, Wayne H., to United States of America, National Aeronautics and Space Administration. Tread drum for animals. 4,088,094, Cl. 119-29.000.
Howarth, Thomas Trefor; and Stirling, Irene, to Beecham Group Limited. Oxoclavams. 4,088,656, Cl. 260-307.0FA.
Howell, Eddie P.; Gant, Orland J., Jr.; Hearn, Daniel P.; and Coffee, Robert D., to Atlantic Richfield Company. Logging probe for making redox potential measurements. 4,088,945, Cl. 324-10.000.
Hruda, Robert M., to Westinghouse Electric Corp. Normal open low voltage vacuum shorting switch. 4,088,859, Cl. 200-144.00B.
Hsu, Michael S. S.: *See—*
Morrow, Walter E., Jr.; and Hsu, Michael S. S., 4,087,976, Cl. 60-643.000.
Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, to Bodenseewerk Perkin-Elmer & Co., GmbH. Method and apparatus for cleansing residue from a sample transfer probe. 4,088,446, Cl. 23-230.00R.
Hucherot, Jean-Jacques: *See—*
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Hudson Pulp & Paper Corp.: *See—*
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Huet, Joel, to Societe Dilumelt, The. Device for continuously mixing a powder in a liquid. 4,089,050, Cl. 366-181.000.
Huff, Terrence, to Exxon Research & Engineering Co. Cross-linked melt-flowable thermoplastic elastomer blend comprising EPR or EPDM, polyethylene and polypropylene. 4,088,714, Cl. 260-897.00A.
Hugelin, Bernard; Blanc, Claude-Alain; and Serex, Charles, to Sublistatic Holding S. A. Temporary carriers and a process for dry transfer printing. 4,088,442, Cl. 8-2.50A.

Huggett, George R.; and Slater, Larry E., to United States of America, Interior. Two-fluid tiltmeter. 4,087,920, Cl. 33-367.000.
Hughes Aircraft Company: *See—*
Kurtin, Stephen L., 4,088,799, Cl. 427-38.000.
Hullwegen, Josef, to Nixdorf Computer AG. Transmission level indicator. 4,088,906, Cl. 307-359.000.
Humphrey, Joseph R.; Hickey, Mickey F.; and Nemeth, Ronald J., to Westinghouse Electric Corp. Multi-position air conditioning unit. 4,088,466, Cl. 62-286.000.
Hunsucker, Jerry H., to IMC Chemical Group, Inc. N-substituted nitroalkyl oxazalidine. 4,088,655, Cl. 260-307.0FA.
Hunsucker, Jerry Hoyt; and Shelton, Robert Wayne, to IMC Chemical Group, Inc. Process for the production of non-lachrymatory nitro amines. 4,088,817, Cl. 544-162.000.
Hunt, Frederick Charles; and Wilson, John Gerald, to Australian Atomic Energy Commission. Phenolic amino-carboxylic acid radiopharmaceuticals. 4,088,747, Cl. 424-1.000.
Hurt, Frank K. Belt switch. 4,088,222, Cl. 198-502.000.
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Hutkin, Irving J. Composite and method for making thin copper foil. 4,088,544, Cl. 204-12.000.
Huvers, Marius E., to Canadair Limited. Rate integrating gyroscopic aiming method and device therefor. 4,087,919, Cl. 33-301.000.
Hyatt, Robert L.; and Niessner, Norbert H., to Ametek, Inc. Wet pick-up vacuum unit motor bearing air seal. 4,088,424, Cl. 417-368.000.
Ibbott, Jack Kenneth. Device and method for improving vaporization rate of volatile fuels. 4,088,104, Cl. 123-141.000.
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Ichimura, Yoshiaki, to Japan Aviation Electronics Industry, Ltd. Connecting structure of terminals. 4,088,382, Cl. 339-99.00R.
Igarashi, Toshiji; and Ohtake, Shinzaburo, to Eisai Co., Ltd. Method for the treatment of hypertension. 4,088,778, Cl. 424-284.000.
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Ikeda, Takahide; and Ishikawa, Michio, to Hitachi, Ltd. High power semiconductor diode. 4,089,020, Cl. 357-15.000.
Ikedo, Tsuneo, to Kabushiki Kaisha Daini Seikosha. Automatic coordinate determining device. 4,088,842, Cl. 178-19.000.
Ikemoto, Kikuji. Balloon vending machine. 4,088,161, Cl. 141-167.000.
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Robertson, Donald Edwin, 4,088,658, Cl. 260-343.410.
Immell, Raymond G.; and Sasser, Bill H., to Motorola, Inc. Dual frequency antenna. 4,089,005, Cl. 343-845.000.
Imperial Chemical Industries Limited: *See—*
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Cumbers, David Charles, 4,088,726, Cl. 264-123.000.
Johnson, Archibald Horace; and Sanderson, Ian Peter, 4,088,431, Cl. 425-198.000.
McLoughlin, Bernard Joseph; and Guildford, Allen John, 4,088,814, Cl. 542-455.000.
Pope, John Anthony; and Andrews, Timothy Douglas, 4,088,492, Cl. 96-75.000.
Waddan, Dhafir Yusuf, 4,088,672, Cl. 260-465.80R.
Inanaga, Kazutoyo; and Miyamoto, Yoshio, to Takeda Chemical Industries, Ltd. Medicament for remedying schizophrenia. 4,088,755, Cl. 424-177.000.
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Gallizia, Achille; and Tangorra, Giorgio, 4,088,523, Cl. 156-125.000.
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International Business Machines Corporation: *See—*
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Castrodale, Daniel Owen; Pendy, William John, Jr.; and Wentink, William Stewart, 4,089,029, Cl. 360-99.000.
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Godard, Dominique Noel; and Milewski, Andrzej Tadeusz, 4,088,833, Cl. 178-88.000.
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Schreiber, William L.; and Pittet, Alan O., 4,088,696, Cl. 260-601.00R.
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Goode, Frederick R., 4,088,208, Cl. 192-4.00A.
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Mickus, Donald J., 4,087,928, Cl. 37-142.00A.
International Solarthermics Corporation: *See—*
Keyes, John H., 4,088,117, Cl. 126-270.000.
Keyes, John H., 4,088,266, Cl. 237-1.00A.
International Standard Electric Corporation: *See—*
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International Telephone and Telegraph Corporation: *See—*
Donahue, Thomas Harbison, 4,089,001, Cl. 343-7.700.
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Paladino, C. Alfred, 4,088,995, Cl. 340-384.00E.
INTERx Research Corporation: *See—*
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Ishida, Torao; Nishimura, Daikichi; Sugawara, Toshiaki; and Ooka, Tadaaki, to Asahi Kasei Kogyo Kabushiki Kaisha. 5-Fluorouracil derivatives. 4,088,646, Cl. 544-313.000.
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Ishikawa, Masakazu; Shibatani, Juichi; Oka, Hiroyuki; Mitsuoka, Naomi; and Matsuda, Mitsuo, to Hosei Buleki Kogyo Kabushiki Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. Method of manufacturing a strut member made of a tube material for use with drum brakes. 4,088,001, Cl. 72-370.000.
Ishikawa, Michio: *See—*
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Ishikura, Seizo: *See—*
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Ishizuka, Shinichi; and Sugimoto, Kenji, to Citizen Watch Company Limited. Compound lathe. 4,087,890, Cl. 29-27.00C.
Isoard, Bernard, to Rhone-Poulenc-Textile. Method and apparatus for detecting the presence of yarns. 4,088,010, Cl. 73-37.700.
Isono, Yoshihiro; and Oda, Masataka, to Minolta Camera Kabushiki Kaisha. Electrophotographic plate with charge transport overlayer. 4,088,483, Cl. 96-1.50R.
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Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, 4,088,853, Cl. 200-19.00R.
Ito, Fumio: *See—*
Date, Nobuaki; Watanabe, Yoshiaki; Sunouchi, Akio; Mashimo, Yukio; Ito, Fumio; and Ito, Tadashi, 4,089,011, Cl. 354-23.00D.
Ito, Tadashi; Sakurada, Nobuaki; Kawamura, Masaharu; Shinoda, Nobuhiko; Ito, Fumio; and Murakami, Hiroyashu, 4,089,010, Cl. 354-23.00D.
Ito, Nobuei: *See—*
Tanaka, Masao; Takemura, Makoto; and Ito, Nobuei, 4,088,608, Cl. 252-466.0PT.
Ito, Tadashi; Sakurada, Nobuaki; Kawamura, Masaharu; Shinoda, Nobuhiko; Ito, Fumio; and Murakami, Hiroyashu, to Canon Kabushiki Kaisha. Display circuit for a camera. 4,089,010, Cl. 354-23.00D.
Ito, Tadashi: *See—*
Date, Nobuaki; Watanabe, Yoshiaki; Sunouchi, Akio; Mashimo, Yukio; Ito, Fumio; and Ito, Tadashi, 4,089,011, Cl. 354-23.00D.
Ito, Yoshikazu: *See—*
Shindo, Takemasa; Ito, Yoshikazu; and Arai, Kenichiro, 4,088,214, Cl. 400-120.000.
Ito, Yukio: *See—*
Suzuki, Hiroshi; Ito, Yukio; and Yasumoto, Yosiro, 4,088,611, Cl. 252-541.000.
Itoh, Susumu: *See—*
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu; Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, 4,088,213, Cl. 193-40.000.
Iversen, Sven Erik; and Lund, Svend Aage, to Akademiet for de Tekniske Videnskaber, Svejsecentralen. Apparatus for ultrasonic examination. 4,088,030, Cl. 73-629.000.
Iwanami, Shinichi: *See—*
Yoshioka, Teruo; and Iwanami, Shinichi, 4,088,578, Cl. 210-73.00W.
J. I. Case Company: *See—*
Golobay, Gary L., 4,087,982, Cl. 61-72.600.
J. M. Eltzroth & Associates, Inc.: *See—*
Miller, Russell C., 4,088,621, Cl. 260-29.60S.
J. M. Huber Corporation: *See—*
Carson, Forrest Leon, 4,088,185, Cl. 166-176.000.
Maynard, Robert Nelson; Skipper, Bobby Ray; and Millman, Nathan, 4,088,732, Cl. 423-122.000.
Takewell, Robert B., 4,088,741, Cl. 423-450.000.
J. W. Suominen OY: *See—*
Suominen, Lennart Eino Olavi, 4,088,520, Cl. 156-73.600.
Jacksch, Bruno; and Muller, Karl, to W. & M. Automation Karl Muller. Endless conveyors for the horizontal rotary conveyance of objects. 4,088,220, Cl. 198-472.000.
Jackson, Hubert Hassel. Utility fixture locator and cutter. 4,087,913, Cl. 30-360.000.
Jackson, Keith L., to General Steel Industries, Inc. Railway locomotive truck. 4,088,080, Cl. 105-136.000.
Jacob, Jose T.: *See—*
Tutein, Thomas R.; Harrington, Anne E.; and Jacob, Jose T., 4,088,600, Cl. 252-344.000.
Jacobs, Marcellus L.; and Jacobs, Paul R. Wind electric plant. 4,088,420, Cl. 416-9.000.
Jacobs, Paul R.: *See—*
Jacobs, Marcellus L.; and Jacobs, Paul R., 4,088,420, Cl. 416-9.000.
Jacoby, Peter H.; Seiz, Carl Gary; and Egner, Robert J., to Seiz Corporation. Storage rack columns having clean-outs. 4,088,229, Cl. 211-191.000.
Jaki, Friedrich: *See—*
Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, 4,088,853, Cl. 200-19.00R.
Jakobs, Willy, to Klockner-Humboldt-Deutz Aktiengesellschaft. Comminution machine with a comminution rotor. 4,088,273, Cl. 241-35.000.
Jalie, Mohammed: *See—*
Choyce, D. Peter; and Jalie, Mohammed, 4,087,866, Cl. 3-13.000.
James, Rex L.: *See—*
Miller, Bradley W.; Hickenlooper, Franklin T.; Uhlrich, David C.; Godfrey, Marl D.; Clifford, Douglas M.; James, Rex L.; Watson, Robert E.; Keith, John C.; and Mortensen, Alan C., 4,089,059, Cl. 364-706.000.
Japan Aircraft Manufacturing Co., Inc.: *See—*
Sogabe, Itsushi; and Souda, Kiyoshi, 4,088,285, Cl. 244-16.000.
Japan Aviation Electronics Industry, Ltd.: *See—*
Ichimura, Yoshiaki, 4,088,382, Cl. 339-99.00R.
Japan Steel Works Ltd., The: *See—*
Fukuda, Yoshihiko; Ishimori, Hidefumi; Toyomatsu, Masafumi; Tsubone, Masayoshi; Mizuguchi, Hideki; and Masuda, Hideo, 4,088,434, Cl. 425-467.000.
Jarvis, William Joseph; and Smith, Terence, to Coal Industry (Patents) Limited. Haulage arrangements for mineral mining machines. 4,088,370, Cl. 299-43.000.
Jeavons, Philip Swingewood, to Wilmot-Breeden Limited. Pivotal connections. 4,088,356, Cl. 292-359.000.
Jedlitschka, Ernst: *See—*
Fabian, Peter; Jedlitschka, Ernst; Krebs, Helmut; and Simon, Heinrich, 4,088,558, Cl. 204-288.000.
Jefferies, Derek Kirk: *See—*
Clampitt, Roy; and Jefferies, Derek Kirk, 4,088,919, Cl. 313-362.000.
Jehmlich, Rolf: *See—*
Hinterkeuser, Jakob; and Jehmlich, Rolf, 4,087,922, Cl. 34-12.000.
Jellies, David A., to Rockwell International Corporation. Cordless meat probe for microwave oven. 4,088,863, Cl. 219-10.55E.
Jenkins, Charmaine A.; and Jenkins, Garry W. Kitchen utensil. 4,088,360, Cl. 294-8.000.
Jenkins, Garry W.: *See—*
Jenkins, Charmaine A.; and Jenkins, Garry W., 4,088,360, Cl. 294-8.000.
Jensen, Arthur S.: *See—*
Wu, Shu-Yau; Bluzer, Nathan; Francombe, Maurice H.; and Jensen, Arthur S., 4,088,546, Cl. 204-15.000.
Jersey Nuclear-Avco Isotopes, Inc.: *See—*
Stitch, Malcolm Lane, 4,088,898, Cl. 307-88.300.
Jewett, James Wilson; and Beemer, Terry Wayne, to Deere & Company. Unitary wheel for industrial use. 4,088,372, Cl. 301-63.00R.
Jim E. Rand Training Systems, Inc.: *See—*
Elam, James O.; and Rudolph, Hans, 4,088,131, Cl. 128-145.700.
Jindra, Karel: *See—*
Vlcek, Karel; Pacakova, Zdena; Jirka, Bohuslav; Cesenek, Bedrich; and Jindra, Karel, 4,088,226, Cl. 209-82.000.
Jirak, Thomas L.: *See—*
Rockland, Ronald H.; and Jirak, Thomas L., 4,088,140, Cl. 128-419.0PG.
Jirka, Bohuslav: *See—*
Vlcek, Karel; Pacakova, Zdena; Jirka, Bohuslav; Cesenek, Bedrich; and Jindra, Karel, 4,088,226, Cl. 209-82.000.
John Laing and Son Limited: *See—*
Cowley, David; and Phillips, Raymond Jeffrey, 4,088,200, Cl. 182-2.000.
Johndrow, John Paul: *See—*
Pallant, Joseph; and Johndrow, John Paul, 4,088,378, Cl. 308-3.00R.
Johns, Tom R. Key cutting device. 4,088,060, Cl. 90-13.050.
Johnson, Archibald Horace; and Sanderson, Ian Peter, to Imperial Chemical Industries Limited. Melt spinning filter. 4,088,431, Cl. 425-198.000.
Johnson, Charles A., to Home Curtain Corp. Heat control for ultrasonic pattern rolls. 4,088,519, Cl. 156-73.100.
Johnson, Donald J. Portable storage apparatus and methods of constructing and utilizing same. 4,088,365, Cl. 296-37.600.
Johnson, Elmer E. Skateboard brake. 4,088,334, Cl. 280-11.200.
Johnson, John. Fireplace heater. 4,088,114, Cl. 126-164.000.
Johnson, Leighton C., to Miles Laboratories, Inc. Process for evenly applying liquid to a surface. 4,088,797, Cl. 427-2.000.
Johnson, Lowell E.; Ireland, Gerald B.; and Schneider, Marvin L., to Caterpillar Tractor Co. Direct drive transmission. 4,088,043, Cl. 74-681.000.
Johnson, Matthey & co., Limited: *See—*
Sermon, Paul Anthony, 4,088,604, Cl. 252-455.00R.
Johnson, Steven J.: *See—*
Podolsky, Leaman B.; Groves, Charles L., Jr.; and Johnson, Steven J., 4,088,875, Cl. 364-494.000.
Jolley, Michael Ralph John: *See—*
Evans, Delme; Jolley, Michael Ralph John; Ross, William James; and Swann, Brian Picton, 4,088,773, Cl. 424-274.000.
Jones, A. Brooke: *See—*
Elkins, Perry E.; Jones, A. Brooke; and Reekstin, John P., Jr., 4,088,896, Cl. 250-505.000.
Jones, Andrew R.: *See—*
Thompson, Robert E.; Spurrier, Francis R.; and Jones, Andrew R., 4,088,535, Cl. 176-87.000.
Jones, Charles H.; and Douglas, George R., to Westinghouse Electric Corp. Piezoelectric acoustic emission instrumentation. 4,088,907, Cl. 310-333.000.
Jones, Charles H.; and Gottlieb, Milton, to Westinghouse Electric Corp. Underwater imaging system. 4,088,979, Cl. 340-5.00H.
Jones, Edwin Vaughan, to Marconi Company Limited, The. Bistable circuits. 4,088,903, Cl. 307-291.000.
Jones, Robert E., to Beach, Marvin F. Free flowing modified whey powder. 4,088,791, Cl. 426-99.000.
Jones, Roderick Frank: *See—*
Buchanan, Donald George; and Jones, Roderick Frank, 4,088,902, Cl. 307-241.000.
Jonker, Roelof R. Multi-image cassette holder. 4,089,019, Cl. 354-124.000.
Jordan, Robert Kenneth. Oxalate hydrogenation process. 4,088,682, Cl. 260-534.00R.
Jourdan, Francis; Lepeytre, Jean-Paul; Masson, Andre; and Le Roux, Charles, to Thomson-CSF; and Etablissements Pierre Angenieux. Optical device comprising mechanical connections transverse to the optical path. 4,088,397, Cl. 350-253.000.
Jourdan, Paul I., to Honeywell Inc. Heater block for low cost gas chromatograph. 4,088,458, Cl. 55-197.000.
Jouret, Jacques Y.: *See—*
Bourg, Andre; Hazart, Jean P. M.; and Jouret, Jacques Y., 4,088,470, Cl. 65-105.000.

Joyce, Hardin, Jr., to Fiat-Allis Construction Machinery, Inc. Impact absorbing vehicle coupling system. 4,088,340, Cl. 280-481.000.

Jung, Michel: *See—*
Casara, Patrick J.; Jung, Michel; and Metcalf, Brian Walter, 4,088,667, Cl. 260-448.20N.
Metcalf, Brian Walter; and Jung, Michel, 4,088,668, Cl. 260-448.20N.

Junker, Arnold E., to Avco Corporation. Controlled aperture seal with drag pad. 4,088,329, Cl. 277-26.000.

K. Oras OY: *See—*
Paasikivi, Erkki Jalmari, 4,088,153, Cl. 137-625.170.

Kaasila, Kauko Johannes: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.

Kabushiki Kaisha Daini Seikosha: *See—*
Ikedo, Tsuneo, 4,088,842, Cl. 178-19.000.
Yajima, Kenji, 4,088,854, Cl. 200-6.00R.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Tomioka, Kunio; Kita, Masaaki; and Sakurai, Terushige, 4,088,000, Cl. 72-342.000.

Kabushiki Kaisha Saneisha Seisakusho: *See—*
Ohba, Shintaro; Hirose, Nobuhiko; Sugihara, Nobuhiro; and Aikawa, Takayuki, 4,087,889, Cl. 24-129.00W.

Kabushiki Kaisha Suwa Seikosha: *See—*
Koichi, Oguchi, 4,087,960, Cl. 58-127.00R.
Shindo, Takemasa; Ito, Yoshikazu; and Arai, Kenichiro, 4,088,214, Cl. 400-120.000.

Kabushiki Kaisha Tsuchiya Seisakusho: *See—*
Sakaki, Yoshihiro; Mitomo, Takeshi; and Nakagaki, Akitsuna, 4,088,181, Cl. 165-8.000.

Kabushikikaisha Tokyo Keiki: *See—*
Yamamoto, Eiji; and Ohta, Koji, 4,088,029, Cl. 73-612.000.

Kaebitzsch, Johannes W.; and Tuegel, John L., to McGraw-Edison Company. Cooking appliance. 4,088,067, Cl. 99-379.000.

Kaeding, Warren W., to Mobil Oil Corporation. Methanol conversion to para - xylene using a zeolite catalyst containing an oxide of boron, magnesium, phosphorus, or mixtures. 4,088,706, Cl. 260-668.00R.

Kali-Chemie Aktiengesellschaft: *See—*
Weidenbach, Guenther; Koepernik, Karl Hermann; and Brautigam, Hans, 4,088,607, Cl. 252-466.0PT.

Kalininskaya, Tatyana Vasilievna: *See—*
Gumen, Valery Fedorovich; Kalininskaya, Tatyana Vasilievna; Loparev, Robert Nikolaevich; and Sladkov, German Vladimirovich, 4,088,908, Cl. 310-49.00R.

Kalippke, Harald: *See—*
Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, 4,088,853, Cl. 200-19.00R.

Kalo, Gyorgy: *See—*
Kocsanyi, Laszlo; Varga, Lajos; Kovacs, Marton; Takats, Ferenc; and Kalo, Gyorgy, 4,088,579, Cl. 210-82.000.

Kalotay, Paul Z., to International Telephone and Telegraph Corporation. Turbine flowmeter and components thereof. 4,088,022, Cl. 73-231.00R.

Kalz, Dietmar; and Wolfrum, Gerhard, to Bayer Aktiengesellschaft. Acylamino quinophthalone compounds. 4,088,651, Cl. 260-287.00H.

Kameswaran, Venkataraman; and Addor, Roger William, to American Cyanamid Company. Substituted-benzyl α-C_1-C_4 alkyl-2-naphthaleneacetates as insecticidal agents. 4,088,782, Cl. 424-304.000.

Kammerer, Heinz: *See—*
Adler, Karl-Heinz; Drews, Ulrich; Werner, Peter; Moller, Heinz; and Kammerer, Heinz, 4,088,927, Cl. 315-209.00T.

Kanaya, Tadashi: *See—*
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu; Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, 4,088,213, Cl. 193-40.000.

Kaneko, Kenji: *See—*
Asai, Shojiro; Masuhara, Toshiaki; and Kaneko, Kenji, 4,089,022, Cl. 357-23.000.

Kanie, Takashi: *See—*
Takezono, Takashi; and Kanie, Takashi, 4,089,063, Cl. 365-200.000.

Kanto Seiki Company, Limited: *See—*
Matsumura, Yasuhiro; and Hata, Shigeki, 4,088,909, Cl. 310-49.00R.

Kao Soap Co., Ltd.: *See—*
Arai, Haruhiko; and Nakasone, Yumio, 4,088,596, Cl. 252-99.000.
Takamori, Shigeru; Yamashita, Kazutaka; and Kono, Yoshinao, 4,088,707, Cl. 260-835.000.

Karayannis, Panayotis, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Spinning projectile equipped with an electromagnetic ignition current generator. 4,088,076, Cl. 102-70.20G.

Karlfors, Levi Johannes: *See—*
Lavon, Erik Volmar; and Karlfors, Levi Johannes, 4,088,368, Cl. 299-13.000.

Karlsson, Jarding Urban; and Blomgren, Gerth Karl Anders, to ABU Aktiebolag. Click signal device for a fishing reel. 4,088,279, Cl. 242-84.10R.

Karpen, William L., to Carpenter Technology Corporation. Lubricant containing MoS_2, lubricating process, and lubricated workpiece. 4,088,585, Cl. 252-28.000.

Karrer, Friedrich, to Ciba-Geigy Corporation. Methylene dioxy-substituted benzene derivatives. 4,088,776, Cl. 424-282.000.

Kassai, Makoto: *See—*
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.

Kato, Taira: *See—*
Usami, Nobuo; and Kato, Taira, 4,088,849, Cl. 179-156.00R.

Kato, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Auxiliary acceleration fuel feed device in an internal combustion engine. 4,088,102, Cl. 123-119.00R.

Kato, Tetuo, to Tokico Ltd. Damping force generating device in hydraulic shock absorber. 4,088,207, Cl. 188-322.000.

Katz, Saul N.; Gottesman, Martin; and Haya, Mateo, to General Foods Corporation. Process for producing coffee extract. 4,088,794, Cl. 426-434.000.

Katzberg, Stephen J.: *See—*
Burcher, Ernest E.; Katzberg, Stephen J.; and Kelly, William L., IV, 4,088,408, Cl. 356-120.000.

Kawada, Shigeki: *See—*
Hashimoto, Yoshihiro; Kawada, Shigeki; Kohari, Katsuo; and Ishida, Hiroshi, 4,088,933, Cl. 318-257.000.

Kawamura, Masaharu: *See—*
Ito, Tadashi; Sakurada, Nobuaki; Kawamura, Masaharu; Shinoda, Nobuhiko; Ito, Fumio; and Murakami, Hiroyashu, 4,089,010, Cl. 354-23.00D.

Kawasaki, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Digital exposure time indicating circuit for camera. 4,089,012, Cl. 354-23.00D.

Kawasaki, Masahiro: *See—*
Uno, Naoyuki; and Kawasaki, Masahiro, 4,089,015, Cl. 354-51.000.

Kawashima, Yutaka: *See—*
Akado, Hajime; Kawashima, Yutaka; Yamaguchi, Akihide; and Matsuura, Hideki, 4,087,966, Cl. 60-278.000.

Kearney & Trecker Corporation: *See—*
Lohneis, Earl R.; and Zankl, Frank, 4,087,901, Cl. 29-568.000.

Kehren, Jean-Paul Andre; and Ousset, Robert Andre, to Societe Nationale des Poudres et Explosifs. Heat-stable molded composite explosives and production. 4,088,518, Cl. 149-11.000.

Keil, Werner: *See—*
Roll, Karl; Hettich, Alfred; Stahl, Hubert; and Keil, Werner, 4,088,197, Cl. 173-12.000.

Keith, John C.: *See—*
Miller, Bradley W.; Hickenlooper, Franklin T.; Uhlrich, David C.; Godfrey, Marl D.; Clifford, Douglas M.; James, Rex L.; Watson, Robert E.; Keith, John C.; and Mortensen, Alan C., 4,089,059, Cl. 364-706.000.

Keller, Alex J., to Automatic Material Handling, Inc. Apparatus for plucking and delivering fiber to a feeder with automatic dust control. 4,087,882, Cl. 15-301.000.

Kelly, William L., IV: *See—*
Burcher, Ernest E.; Katzberg, Stephen J.; and Kelly, William L., IV, 4,088,408, Cl. 356-120.000.

Kempermann, Theo: *See—*
Roos, Ernst; Langner, Gunter; Kempermann, Theo; and Redetzky, Wolfgang, 4,088,630, Cl. 260-45.80A.

Kendall, Michael P.: *See—*
Smith, R. Lowell; Logan, J. Douglas; and Kendall, Michael P., 4,088,891, Cl. 250-315.00R.

Kenkare, Divaker B.; Gray, Frederick W.; and Shumway, Durland K., to Colgate-Palmolive Company. Self-heating cosmetic. 4,088,751, Cl. 424-47.000.

Kennedy, William P., to Pioneer Heddle and Reed Company Incorporated. Heddle rod hanger assembly. 4,088,158, Cl. 139-92.000.

Kerr, Leo A.; Sinsky, Allen I.; and Gonsalves, Richard, to Bendix Corporation, The. CFAR threshold adaptive target coordinate extractor. 4,089,002, Cl. 343-11.00R.

Keyes Fibre Company: *See—*
Sutton, John T., 4,088,259, Cl. 229-2.5EC.

Keyes, John H., to International Solarthermics Corporation. Solar heat collecting units. 4,088,117, Cl. 126-270.000.

Keyes, John H., to International Solarthermics Corporation. Method and apparatus for collecting, storing and transmitting solar heat. 4,088,266, Cl. 237-1.00A.

Keystone Consolidated Industries, Inc.: *See—*
Amdal, Dagfinn O., 4,087,883, Cl. 16-82.000.

Khan, Abid A.: *See—*
Tyler, Derek E.; Dickinson, David W.; Dore, James E.; and Khan, Abid A., 4,088,475, Cl. 75-76.000.

Khutoretsky, Garri Mikhailovich: *See—*
Prigorovsky, Igor Alexandrovich; Ignatiev, Anatoly Denisovich; Shkolnik, Vladimir Emmanuilovich; Khutoretsky, Garri Mikhailovich; Vorontsov, Alexandr Ivanovich; and Fridman, Vladimir Markovich, 4,088,913, Cl. 310-260.000.

Ki Hyun Lee: *See—*
Lee, Soo B., 4,088,454, Cl. 44-51.000.

Kienzle, Frank: *See—*
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,088,645, Cl. 544-232.000.

Kikuchi, Toshiaki: *See—*
Shono, Hiroaki; Wakasa, Isao; Kikuchi, Toshiaki; and Noji, Toshio, 4,088,467, Cl. 65-2.000.

Kim, Han J.; Reid, F. Joseph; and Scimeca, Frederick J., to GTE Laboratories Incorporated. Process for preparing refractory metal-silver-cadmium alloys. 4,088,480, Cl. 75-200.000.

Kim, In Su; and Lee, Bong Suk. Electron irradiator. 4,088,137, Cl. 128-419.00N.

Kimball, Michael E., to Goodyear Tire & Rubber Company, The. 2,2'-Dithiodianiline cured polyurethane. 4,088,636, Cl. 260-77.5AM.

Kimball, Stephen F.: *See*—
Gates, Paul E.; and Kimball, Stephen F., 4,088,918, Cl. 313-315.000.
Kimura, Tomoaki: *See*—
Yabuki, Takashi; Shidara, Naohiro; and Kimura, Tomoaki, 4,088,179, Cl. 164-441.000.
King, John M.: *See*—
Wilgus, Donovan R.; and King, John M., 4,088,586, Cl. 252-51.50R.
Kingsley, William, to Xerox Corporation. Replenishable photosensitive system. 4,088,403, Cl. 355-16.000.
Kinnaird, Richard Clyde, Jr., to Bell Telephone Laboratories, Incorporated. Telephone station set interface circuit. 4,088,844, Cl. 179-99.000.
Kinoshita, Yoshio; and Iguchi, Masayuki, to Glory Kogyo Kabushiki Kaisha. Rental time control system in coin-operated locker. 4,088,873, Cl. 235-92.0AC.
Kirby, Thomas J., to GTE Sylvania Incorporated. Immittance monitoring apparatus. 4,088,950, Cl. 324-95.000.
Kirchmayr, Rudolf: *See*—
Felder, Louis; Kirchmayr, Rudolf; and Bellus, Daniel, 4,088,554, Cl. 204-159.150.
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, to Pilkington Brothers Limited. Apparatus for coating glass. 4,088,471, Cl. 65-182.00R.
Kistler Instrumente AG: *See*—
Wolfer, Peter, 4,088,015, Cl. 73-141.00R.
Kistner, John F.: *See*—
Fairbanks, Charles W.; and Kistner, John F., 4,088,500, Cl. 106-35.000.
Kita, Masaaki: *See*—
Tomioka, Kunio; Kita, Masaaki; and Sakurai, Terushige, 4,088,000, Cl. 72-342.000.
Kita, Toru; and Fujishiro, Takeshi, to Nissan Motor Company, Limited. Oxygen sensor particularly for use in exhaust system of automotive engine. 4,088,555, Cl. 204-195.00S.
Kitano, Mitsuru: *See*—
Uchida, Ryohei; Kitano, Mitsuru; and Morimoto, Yoshinobu, 4,088,937, Cl. 318-441.000.
Kitchin, Oscar G.: *See*—
Doller, John S.; and Kitchin, Oscar G., 4,088,211, Cl. 192-45.000.
Kittredge, Gifford, to W & H Conveyor Systems, Inc. Powered roller conveyor. 4,088,224, Cl. 198-783.000.
Kleeberg, Wolfgang: *See*—
Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, 4,088,489, Cl. 96-35.100.
Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Carboxyphenylalkylphosphinic acids, their esters and process for their preparation. 4,088,677, Cl. 260-502.40R.
Klie, Wolfgang; Hutai, Hubert; and Fischer, Wolfgang, to Daimler-Benz Aktiengesellschaft. Bumper for motor vehicles. 4,088,357, Cl. 293-98.000.
Klimashko, Vladimir Vasilievich: *See*—
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.
Kling, Alberto. Wind-driven power plant. 4,088,352, Cl. 290-55.000.
Klingaman, Richard James, to Colgate-Palmolive Company. Capsule and container therefor. 4,088,246, Cl. 222-88.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Deussner, Herbert; Ramesohl, Hubert; and Herchenbach, Horst, 4,088,438, Cl. 432-106.000.
Hinterkeuser, Jakob; and Jehmlich, Rolf, 4,087,922, Cl. 34-12.000.
Jakobs, Willy, 4,088,273, Cl. 241-35.000.
Klopsch, Herbert; Lobert, Klaus; and Stamm, Dietrich, to Inventio AG. Safety circuit, especially for elevators and the like. 4,088,900, Cl. 307-149.000.
Kmetz, Allan R.; and Wild, Peter J., to BBC Brown, Boveri & Company, Limited. Electro-optical display device using a liquid crystal cell. 4,088,992, Cl. 340-336.000.
Knapp, Kenneth K., to Eaton Corporation. Sleeve spool valve. 4,087,967, Cl. 60-392.000.
Knappstein, Johannes; and Strobel, Manfred, to Carl Still Recklinghausen, Firma. Device for pushing incandescent coke out of the oven chambers of horizontal coke oven batteries. 4,088,233, Cl. 214-23.000.
Knaus, Edward E.; Redda, Kinfe; and Wandelmaier, Frank Wilhelm, to Canadian Patents and Developments Limited. Tetrahydropyridyl derivatives. 4,088,653, Cl. 260-295.0AM.
Kneitel, Dieter: *See*—
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,088,593, Cl. 252-89.00R.
Knoblauch, Wolfgang; Mucke, Rainer; and Salvador, Rene, to Hoechst Aktiengesellschaft; and Alfred Teves GmbH. Hydraulic fluid containing tertiary butyl ethers. 4,088,590, Cl. 252-73.000.
Knoll A.G. Chemische Fabriken: *See*—
Cyrus, Richard; and Raschack, Manfred, 4,088,763, Cl. 424-250.000.
Kobylinski, Thaddeus P., to Gulf Research & Development Company. Conversion of synthesis gas using a cobalt-ruthenium catalyst. 4,088,671, Cl. 260-449.60R.
Koch, James Preston. Tree watering device. 4,087,938, Cl. 47-48.500.
Koch, Josef: *See*—
Schluep, Rene; and Koch, Josef, 4,088,171, Cl. 160-170.000.
Kocsanyi, Laszlo; Varga, Lajos; Kovacs, Marton; Takats, Ferenc; and Kalo, Gyorgy, to Heves Megyei Tanacsi Epitoipari Vallalat. Process and equipment for the thickening of slurries. 4,088,579, Cl. 210-82.000.
Kodama, Akihiko, to Pioneer Electronic Corporation. Curved polymeric piezoelectric electro-acoustic transducer. 4,088,915, Cl. 310-334.000.
Kodama, Michiko: *See*—
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.
Koepernik, Karl Hermann: *See*—
Weidenbach, Guenther; Koepernik, Karl Hermann; and Brautigam, Hans, 4,088,607, Cl. 252-466.0PT.
Kohari, Katsuo: *See*—
Hashimoto, Yoshihiro; Kawada, Shigeki; Kohari, Katsuo; and Ishida, Hiroshi, 4,088,933, Cl. 318-257.000.
Kohaut, John E., to Raceway Components, Inc. Insert mount and device. 4,088,827, Cl. 174-48.000.
Kohlen, Rudolf; Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, to Metallgesellschaft Aktiengesellschaft. Process and apparatus for a pressure gasification of fuels mainly in lump form. 4,088,455, Cl. 48-202.000.
Koichi, Oguchi, to Kabushiki Kaisha Suwa Seikosha. Solar battery wristwatch. 4,087,960, Cl. 58-127.00R.
Kojima, Toshitake: *See*—
Ogawa, Masanobu; and Kojima, Toshitake, 4,088,822, Cl. 560-207.000.
Kokado, Nawoyuki: *See*—
Suzuki, Yasoji; Shigematsu, Tomohisa; Kokado, Nawoyuki; and Kudo, Yukinori, 4,088,958, Cl. 325-396.000.
Kolendowicz, Charles W., to Litton Systems, Inc. Door locking mechanism for self-cleaning oven. 4,088,354, Cl. 292-201.000.
Koller Die and Tool Co.: *See*—
Starr, Frank, 4,088,005, Cl. 72-404.000.
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, to Bayer Aktiengesellschaft. Substituted phenylguanidines and processes for their preparation and use. 4,088,780, Cl. 424-300.000.
Komarov, Jury Ivanovich; Svirin, Dmitry Andreyanovich; Titov, Dmitry Vladimirovich; and Lukhmanov, Viktor Mikhailovich. Loom device for holding weft thread ends. 4,088,159, Cl. 139-194.000.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, to Canon Kabushiki Kaisha. Repeating mechanism for a copying apparatus. 4,088,872, Cl. 235-91.00R.
Kondo, Hiroyuki; Nitta, Takahisa; and Moriguchi, Yoshiro, to Hitachi, Ltd. Method of manufacturing a semiconductor device. 4,088,516, Cl. 148-187.000.
Kongshavn, Erik: *See*—
Lund, Svend Aage; Kongshavn, Erik; and Ostgaard, Erik, 4,088,866, Cl. 219-137.00R.
Konishiroku Photo Industry Co., Ltd.: *See*—
Habu, Teiji; Korematsu, Shinobu; Wada, Tsuneo; Omura, Takayosi; Ishii, Hiroki; and Sasaki, Takashi, 4,088,495, Cl. 96-111.000.
Kono, Yoshinao: *See*—
Takamori, Shigeru; Yamashita, Kazutaka; and Kono, Yoshinao, 4,088,707, Cl. 260-835.000.
Kono, Yutaka. Safety submarine spherical air chamber. 4,087,980, Cl. 61-69.00R.
Korematsu, Shinobu: *See*—
Habu, Teiji; Korematsu, Shinobu; Wada, Tsuneo; Omura, Takayosi; Ishii, Hiroki; and Sasaki, Takashi, 4,088,495, Cl. 96-111.000.
Korger, Heinz, to Marker, Hannes. Sliding device. 4,088,345, Cl. 280-636.000.
Korner, Anneliese F.; Piziali, Robert L.; and Ellsworth, Orval T., to Leland Stanford Junior University, The Board of Trustees of. Method for treating premature infants. 4,088,124, Cl. 128-1.00B.
Korry Manufacturing Co.: *See*—
Emery, William Boyd, 4,088,855, Cl. 200-16.00A.
Kosaka, Katuaki; Ueno, Zene; Ishikura, Seizo; and Chida, Atushi, to Nissan Motor Company, Limited. Hydrogen generator. 4,088,450, Cl. 23-288.00L.
Kosinsky, Konstantin Alexeevich: *See*—
Demin, Alexandr Viktorovich; Balezin, Igor Nikolaevich; Kosinsky, Konstantin Alexeevich; Serebrennikov, Vladimir Nikolaevich; Popov, Vadim Likarionovich; Shipkov, Nikolai Nikolaevich; and Dovguchits, Eduard Fedorovich, 4,088,503, Cl. 106-56.000.
Kosmowski, Wojciech, to Advanced Controls Corp. Method and apparatus for high speed, high precision drilling and machining. 4,088,417, Cl. 408-1.0BD.
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich. Method of forming castings in holes. 4,088,720, Cl. 264-32.000.
Kovacs, Marton: *See*—
Kocsanyi, Laszlo; Varga, Lajos; Kovacs, Marton; Takats, Ferenc; and Kalo, Gyorgy, 4,088,579, Cl. 210-82.000.
Krafft, Werner; Matschke, Gunther; and Wolff, Erich, to Agfa-Gevaert Aktiengesellschaft. Diffusion retarding layers comprising polymers of dimethoxyethylene. 4,088,493, Cl. 96-77.000.

Kraft, Inc.: *See*—
Miller, Roland E.; Scaletta, Joseph A.; and Valek, John, 4,088,086, Cl. 113-30.000.

Kralik, Andrew J.: *See*—
Kussy, Frank W.; Dimarco, Bernard; Kralik, Andrew J.; and Krueger, Keith T., 4,088,973, Cl. 335-6.000.

Kramer, Richard L., to General Motors Corporation. Steering column having manual lever for controlling turn signal and headlamp dimmer switches. 4,088,858, Cl. 200-61.270.

Kraus, Charles E., to Incelermatic, Inc. Energy storing flywheel drive. 4,088,041, Cl. 74-572.000.

Krautkramer-Branson, Incorporated: *See*—
Hildebrandt, Heiner H. G., 4,088,028, Cl. 73-611.000.

Krebs, Helmut: *See*—
Fabian, Peter; Jedlitschka, Ernst; Krebs, Helmut; and Simon, Heinrich, 4,088,558, Cl. 204-288.000.

Krechel, Joseph L.; and Purvis, Michael J., to Control Devices, Incorported. Air chuck. 4,088,147, Cl. 137-223.000.

Kriebel, Manfred: *See*—
Bratzler, Karl; Doerges, Alexander; Hochgesand, Gerhard; and Kriebel, Manfred, 4,088,735, Cl. 423-219.000.

Krob, Erwin, to TMC Corporation. Front jaw. 4,088,343, Cl. 280-625.000.

Krolak, Leo Vincent: *See*—
Gatto, Donald Frederick; Milciunas, Juan; Strobel, William Karl; Krolak, Leo Vincent; and Varasse, Pete, 4,089,044, Cl. 361-422.000.

Krueger, Keith T.: *See*—
Kussy, Frank W.; Dimarco, Bernard; Kralik, Andrew J.; and Krueger, Keith T., 4,088,973, Cl. 335-6.000.

Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, to Fujitsu Limited. Electrical contact and process of manufacture. 4,088,803, Cl. 427-123.000.

Kubo, Shinsuke; and Kuzunishi, Hiroyuki, to Oiles Industry Co., Ltd.; and Chuo Spring Co., Ltd. Flexible conduit assembly. 4,088,156, Cl. 138-109.000.

Kubota, Yuzuru: *See*—
Okuyama, Toshiaki; and Kubota, Yuzuru, 4,088,932, Cl. 318-138.000.

Kudlich, Walter: *See*—
Gubisch, Erwin; Kudlich, Walter; Popp, Walter; and Reinicke, Herbert, 4,088,625, Cl. 260-42.000.

Kudo, Yukinori: *See*—
Suzuki, Yasoji; Shigematsu, Tomohisa; Kokado, Nawoyuki; and Kudo, Yukinori, 4,088,958, Cl. 325-396.000.

Kuechli, Gottfried; and Volgyi, Paul, to Societe Suisse pour l'Industrie Horlogere Management Services, S.A. Method of manufacture of watch case. 4,087,894, Cl. 29-179.000.

Kuehl, Burkhart: *See*—
Hermann, Walter; Kuehl, Burkhart; and Schuck, Wolf Dieter, 4,088,971, Cl. 333-84.00R.

Kuehlhorn, Bert O. Carton for articles of varying sizes. 4,088,262, Cl. 229-27.000.

Kufner, Kenneth L.: *See*—
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,087,908, Cl. 29-753.000.

Kuhlman, Tom Evan, to Docks Unlimited. Dock system. 4,087,977, Cl. 61-48.000.

Kuhn, Eberhard: *See*—
Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, 4,088,489, Cl. 96-35.100.

Kuhnert, Johannes, to Hoechst Aktiengesellschaft. External sizing and cooling of extruded tubular profiles of thermoplastic material. 4,088,724, Cl. 264-85.000.

Kullman, Russell M. H.; and Reinhardt, Robert M., to United States of America, Agriculture. Aluminum chlorhydroxide-phosphoric acid catalyst system for flash cure treatments to give improved durable-press properties in cellulose-containing textiles. 4,088,443, Cl. 8-116.00P.

Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, to Hitachi, Ltd. Irregular ferroelectric element devised for single domain-wall motion. 4,088,391, Cl. 350-150.000.

Kuraray Co., Ltd.: *See*—
Ichimura, Hideziro; Tsuchiya, Shizuo; and Tanba, Yoshihiro, 4,088,616, Cl. 260-2.5AY.
Nihongi, Yutaka; and Yasuhira, Nobuo, 4,088,620, Cl. 260-29.4UA.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Suzuki, Seiichi; and Endo, Tomizo, 4,088,300, Cl. 251-319.000.

Kuroda, Masahiro, to Bridgestone Tire Company Limited. Reinforced bead portion for pneumatic tires. 4,088,169, Cl. 152-362.00R.

Kuroda, Nobuyuki: *See*—
Matuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Humiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,088,812, Cl. 526-121.000.

Kurosaki, Shiro: *See*—
Nakahara, Tsuneo; Hoshikawa, Masao; Shiraishi, Satoshi; Kurosaki, Shiro; and Fujiwara, Kunio, 4,088,388, Cl. 350-96.300.

Kurtin, Stephen L., to Hughes Aircraft Company. Method of producing an electrical resistance device. 4,088,799, Cl. 427-38.000.

Kussy, Frank W.; Dimarco, Bernard; Kralik, Andrew J.; and Krueger, Keith T., to Gould Inc. Unitized combination starter. 4,088,973, Cl. 335-6.000.

Kuwabara, Kiyoaki: *See*—
Nakajima, Mikio; and Kuwabara, Kiyoaki, 4,088,573, Cl. 210-53.000.

Kuzev, Lyubomir Vladimirov: *See*—
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.

Kuzunishi, Hiroyuki: *See*—
Kubo, Shinsuke; and Kuzunishi, Hiroyuki, 4,088,156, Cl. 138-109.000.

Kyncl, Jaroslav: *See*—
Winn, Martin; and Kyncl, Jaroslav, 4,088,765, Cl. 424-258.000.

La Brosse et Dupont: *See*—
Rossignol de la Ronde, Raymond Rene; and Castek, Charles Henri, 4,088,413, Cl. 401-282.000.

La Telemecanique Electrique: *See*—
Fraboni, Gilbert; and Neyroud, Jean, 4,089,043, Cl. 361-415.000.

La Bar, Richard G., to Aluminum Company of America. Corrosion resistant castable refractory mix. 4,088,502, Cl. 106-64.000.

LaBove, Larry D.; and Mann, Patrick A., to LaBove, Larry D. Dispensing vest for patients receiving hyperalimentation. 4,087,864, Cl. 2-102.000.

Lacy, Dean. Apparatus for forming and threading stock. 4,087,875, Cl. 10-11.00R.

Laesser, Claude, to Ebauches S.A. Driving mechanism of a member of timepiece moving intermittently. 4,087,959, Cl. 58-116.00M.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Chevalier, Claude; Le Diouron, Raymond; Schoutteten, Christian; Le Floch, Daniel; and Le Bot, Jean-Pierre, 4,087,899, Cl. 29-527.600.

Laitram Corporation, The: *See*—
Lapeyre, James M., 4,088,121, Cl. 126-271.000.

Lalanne, Alain; and Renaudin, Yves, to Societe Lannionnaise d'Electronique Sle-Citerel S.A. Relay matrix switch. 4,088,845, Cl. 179-18.0GE.

Laloz, Jean-Pierre: *See*—
Gadelle, Claude; Laloz, Jean-Pierre; and Seree de Roch, Irenee, 4,088,734, Cl. 423-210.000.

LaManna, Richard J.; Drillick, Jacob H.; and Polad, Michael D., to Data Card Corporation. Automatic embossing system. 4,088,216, Cl. 400-130.000.

Lambourn, Edward H.: *See*—
Butcher, John A. W.; and Lambourn, Edward H., 4,088,831, Cl. 178-69.100.

Lamminen, Veikko, to Oy Tampella Ab. Dewatering device for the wire section of a paper or board machine. 4,088,531, Cl. 162-352.000.

Lamond, Lee, to Celanese Corporation. Heat activated plunger. 4,088,192, Cl. 169-19.000.

Landers, Don B., to Oil States Rubber Company. Multiple diaphragm seal assembly. 4,087,978, Cl. 61-53.000.

Lang, Gregor L. Alternating current solenoids. 4,088,975, Cl. 335-244.000.

Langeluddeke, Peter: *See*—
Matterstock, Karl; Langeluddeke, Peter; and Schulze, Ernst-Friedrich, 4,088,474, Cl. 71-108.000.

Langer, Arthur W., Jr.; and Whitney, Thomas A., to Exxon Research & Engineering Co. Reductions with chelated lithium hydridoaluminates or hydridoborates. 4,088,666, Cl. 260-439.00R.

Langner, Gunter: *See*—
Roos, Ernst; Langner, Gunter; Kempermann, Theo; and Redetzky, Wolfgang, 4,088,630, Cl. 260-45.80A.

Lantzsch, Reinhard: *See*—
Uhrhan, Paul; Lantzsch, Reinhard; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,088,629, Cl. 260-45.80N.

Lapeyre, James M., to Laitram Corporation, The. Solar energy concentrator. 4,088,121, Cl. 126-271.000.

Larsen, Walter L.; and Larsen, William L. Equipment-moving dolly. 4,088,337, Cl. 280-79.10R.

Larsen, William L.: *See*—
Larsen, Walter L.; and Larsen, William L., 4,088,337, Cl. 280-79.10R.

LaSalle Steel Company: *See*—
Rowney, Michael J., 4,088,511, Cl. 148-12.00F.

Lauderslager, James B.; and Pacala, Thomas J., to United States of America, National Aeronautics and Space Administration. Charge transfer reaction laser with preionization means. 4,088,965, Cl. 331-94.50G.

Lauer, Robert: *See*—
Zucker, Joseph; and Lauer, Robert, 4,088,389, Cl. 350-96.150.

Laule, Thomas M.; and Blackman, R. Eugene, to Parise & Sons, Inc. Hot-water extraction unit. 4,088,462, Cl. 55-437.000.

Lavon, Erik Volmar; and Karlfors, Levi Johannes, to Atlas Copco Aktiebolag. Method for explosive breaking of hard compact material. 4,088,368, Cl. 299-13.000.

Lavrentiev, Konstantin Andreevich: *See*—
Popov, Gennady Petrovich; Mikhailidi, Alexandr Konstantinovich; Lavrentiev, Konstantin Andreevich; Popov, Ivan Grigorievich; Zhukov, Viktor Vasilievich; and Sorokin, Nikolai Alexeevich, 4,088,609, Cl. 252-512.000.

Lawrence Peska Associates, Inc.: *See*—
Gierla, Joyce, 4,088,317, Cl. 273-31.000.

Layman, H. David; and Minner, Henry B., to GTE Sylvania Incorporated. Zinc sulfide phosphor coactivated with copper and aluminum. 4,088,921, Cl. 313-467.000.

Lebada, Ioan: *See—*
Barna, Gheorghe; Stefan, Silviu; Suselescu, Mircea; Barbu, Cornelius; Chiose, Sergiu; Lebada, Ioan; and Negulescu, Florian, 4,089,056, Cl. 364-551.000.

LeBegue, Maurice K.; and Herron, Charles R., to National Mine Service Company. Boom stabilizer for an underground mining machine. 4,088,371, Cl. 299-76.000.

Le Bot, Jean-Pierre: *See—*
Chevalier, Claude; Le Diouron, Raymond; Schoutteten, Christian; Le Floch, Daniel; and Le Bot, Jean-Pierre, 4,087,899, Cl. 29-527.600.

LeCardonnel, Gerard; Gravez, Pierre; and Favre, Rene Marc, to Thomson-CSF. Device for encoding a plurality of analogical signals. 4,088,993, Cl. 340-347.0AD.

Lederer, Michael; and Strobel, Wolfgang, to Hoechst Aktiengesellschaft. Process for preparing impact resistant polyvinyl aromatics. 4,088,712, Cl. 260-878.00R.

Le Diouron, Raymond: *See—*
Chevalier, Claude; Le Diouron, Raymond; Schoutteten, Christian; Le Floch, Daniel; and Le Bot, Jean-Pierre, 4,087,899, Cl. 29-527.600.

Lee, Bong Suk: *See—*
Kim, In Su; and Lee, Bong Suk, 4,088,137, Cl. 128-419.00N.

Lee Company, The: *See—*
Lee, Leighton, II, 4,088,350, Cl. 285-322.000.

Lee, James Patrick, Jr.; Raffa, Joseph Anthony; Sansone, Frank Peter; and Stochel, Nathan Harold, to Bell Telephone Laboratories, Incorporated. Alternative direct and indirect addressing. 4,089,051, Cl. 364-200.000.

Lee, Ki Hyun: *See—*
Lee, Soo B., 4,088,452, Cl. 44-51.000.

Lee, Leighton, II, to Lee Company, The. Plastic tubing connector. 4,088,350, Cl. 285-322.000.

Lee, Soo B., to Lee, Ki Hyun. Prefuel composition and method. 4,088,452, Cl. 44-51.000.

Lee, Soo B., to Ki Hyun Lee. Method for producing a liquid fuel composition. 4,088,454, Cl. 44-51.000.

Leff, Jerry: *See—*
Duke, Peter James; Leff, Jerry; Liclican, Leo Calica; and Powell, Mark Vernon, 4,088,490, Cl. 96-36.200.

Le Floch, Daniel: *See—*
Chevalier, Claude; Le Diouron, Raymond; Schoutteten, Christian; Le Floch, Daniel; and Le Bot, Jean-Pierre, 4,087,899, Cl. 29-527.600.

Lefort, Marcel: *See—*
Bargain, Michel; and Lefort, Marcel, 4,088,670, Cl. 260-448.20Q.

Lehnert, Erhard: *See—*
Frania, Josef; and Lehnert, Erhard, 4,088,205, Cl. 188-196.00D.

Leiba, Eugene: *See—*
Assouline, Georges; Hareng, Michel; Roncillat, Michel; and Leiba, Eugene, 4,088,400, Cl. 353-20.000.

Leimbacher, Erwin; Siegrist, Otto; and Steiger, Alfred, to Heberlein Textildruck AG. Transfer printing of treated cellulosics. 4,088,440, Cl. 8-2.50A.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Korner, Anneliese F.; Piziali, Robert L.; and Ellsworth, Orval T., 4,088,124, Cl. 128-1.00B.

L'Electronique Appliquee: *See—*
Castet, Andre, 4,088,840, Cl. 179-18.0GF.

LeMay, Christopher Archibald Gordon, to EMI Limited. Radiography method comprising determination of corrected absorption values for members of sets of mutually inclined beam paths. 4,088,887, Cl. 250-366.000.

Lemberger, Louis: *See—*
Archer, Robert A.; and Lemberger, Louis, 4,088,777, Cl. 424-283.000.

Le Pape, Alain Yves, to Produits Chimiques Ugine Kuhlmann. New dyes of the naphtoylenebenzimidazole series. 4,088,650, Cl. 260-282.000.

Lepeytre, Jean-Paul: *See—*
Jourdan, Francis; Lepeytre, Jean-Paul; Masson, Andre; and Le Roux, Charles, 4,088,397, Cl. 350-253.000.

Le Roux, Charles: *See—*
Jourdan, Francis; Lepeytre, Jean-Paul; Masson, Andre; and Le Roux, Charles, 4,088,397, Cl. 350-253.000.

Leslie Hartridge Limited: *See—*
Emerson, Reginald Stanley, 4,088,012, Cl. 73-119.00A.

Lessig, John A.: *See—*
Hoffman, Paul H.; and Lessig, John A., 4,087,887, Cl. 17-73.000.

Levene, Martin Lewis, to RCA Corporation. Creating a closed image from segments. 4,088,867, Cl. 219-216.000.

Lever Brothers Company: *See—*
Bevan, David William; Clarke, Michael Willam; Haisman, Derek Robin; and Pendlington, Sydney, 4,088,790, Cl. 426-96.000.
Bevan, Geoffrey; and Carter, Peter, 4,088,610, Cl. 252-541.000.
Carter, Malcolm Nigel Alan; McGhee, Brian; Helliwell, John Fielden; Marshall, John Kerr; and Naik, Appayya Raghunath, 4,088,612, Cl. 252-545.000.

Levesque, Lucien. Tree shearing device. 4,088,163, Cl. 144-34.00E.

Levy, Edward D.: *See—*
Breslau, Steven M.; Grossman, Morris Gary; and Levy, Edward D., 4,087,926, Cl. 34-70.000.

Levy, Jerome F.: *See—*
Emmons, William D.; and Levy, Jerome F., 4,088,674, Cl. 560-154.000.

Lewin, Nathan: *See—*
Blakemore, Judith I.; Lewin, Nathan; and Burgett, Michael W., 4,088,746, Cl. 424-1.000.

Lewis, Adolph L., to United States of America, Navy. Optical switch. 4,088,387, Cl. 350-96.150.

Lewis, Donald J. Fluorescent bike lamp. 4,088,882, Cl. 362-217.000.

Lewis, Joseph Earle: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,088,471, Cl. 65-182.00R.

Li, Yao Tzu, to Massachusetts Institute of Technology. Archery bow. 4,088,111, Cl. 124-23.00R.

Liberman, Serafima Solomonovna: *See—*
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

Liclican, Leo Calica: *See—*
Duke, Peter James; Leff, Jerry; Liclican, Leo Calica; and Powell, Mark Vernon, 4,088,490, Cl. 96-36.200.

Liggett & Myers Incorporated: *See—*
Hall, Floyd Van, 4,088,065, Cl. 93-1.00C.

Lilja, Jan Evert; and Nilsson, Sven Erik Lennart. Apparatus for sampling, mixing the sample with a reagent and making particularly optical analyses. 4,088,448, Cl. 23-259.000.

Lilly, George E., to Clark Equipment Co. Apparatus with storage cells disposed adjacent vertical shafts having covers and a lift means movable thereabove. 4,088,232, Cl. 214-16.40A.

Lilly Industries Limited: *See—*
Evans, Delme; Jolley, Michael Ralph John; Ross, William James; and Swann, Brian Picton, 4,088,773, Cl. 424-274.000.

Lindemann, Klaus; Reinecke, Erich; and Weise, Lutz, to WABCO Westinghouse G.m.b.H. Wheel anti-skid brake control system for a road vehicle. 4,088,376, Cl. 303-96.000.

Lindsay, William T., Jr.: *See—*
Charles, Robert G.; and Lindsay, William T., Jr., 4,088,946, Cl. 324-220.000.

Linforth, William J.: *See—*
Doe, Ewart H.; and Linforth, William J., 4,088,230, Cl. 214-1.200.

Linne, Robert Steven, to Southwire Company. Metallic rod product, and method for producing same. 4,087,898, Cl. 29-527.500.

Linton, Thomas Harry. Herbicidal composition for weed control. 4,088,473, Cl. 71-92.000.

Lipo, Thomas Anthony: *See—*
D'Atre, John Douglas; Lipo, Thomas Anthony; and Plunkett, Allan Barr, 4,088,934, Cl. 318-227.000.

Lipovetsky, Lazar Moiseevich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.

Lippacher, Wolfgang; Deutschenbaur, Paul; and Teger, Gerhard, to Hilti Aktiengesellschaft. Impact dowel with expanding sleeve and spreading element. 4,088,054, Cl. 85-84.000.

Litster, John F.: *See—*
Gupta, Shanti S.; Bhatnagar, Vijaya K.; and Litster, John F., 4,088,851, Cl. 179-170.200.

Littleton, Gene. Tape holder and dispenser. 4,088,276, Cl. 242-55.530.

Litton Systems, Inc.: *See—*
Baron, David Alan, 4,088,024, Cl. 73-343.00R.
Kolendowicz, Charles W., 4,088,354, Cl. 292-201.000.

Litz, Harold. Crankcase-scavenged engine. 4,088,097, Cl. 123-73.0AA.

Lobert, Klaus: *See—*
Klopsch, Herbert; Lobert, Klaus; and Stamm, Dietrich, 4,088,900, Cl. 307-149.000.

Lockard, Joseph LaRue, to AMP Incorporated. Circuit programming device. 4,089,041, Cl. 361-403.000.

Lockett, James F., to Geosource Inc. Multiplexed sorting apparatus with test circuitry. 4,088,227, Cl. 209-111.600.

Lockheed Aircraft Corporation: *See—*
Tyree, Gerald Wayne, 4,088,053, Cl. 85-37.000.

Lodge, James R., to Minnesota Mining and Manufacturing Company. Alkali metal silicate-zinc hydroxychloride coating composition. 4,088,810, Cl. 428-446.000.

Logan, J. Douglas: *See—*
Smith, R. Lowell; Logan, J. Douglas; and Kendall, Michael P., 4,088,891, Cl. 250-315.00R.

Loge, Olaf: *See—*
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,088,775, Cl. 424-278.000.

Logsdon, Duane D. Check valve structure for use in drains. 4,088,149, Cl. 137-433.000.

Lohneis, Earl R.; and Zankl, Frank, to Kearney & Trecker Corporation. Tool change mechanism for machine tools. 4,087,901, Cl. 29-568.000.

Lombardo, Dennis M.: *See—*
Woodruff, William C.; Lombardo, Dennis M.; and Horrell, Theodore H., Jr., 4,088,109, Cl. 123-179.00H.

Lombardo, Gerard: *See—*
Berger, Pierre; de Choudens, Christian; Lombardo, Gerard; and Monzie, Pierre, 4,088,528, Cl. 162-19.000.

Loose, Richard D.: *See—*
Arlauskas, Alfonsas; and Loose, Richard D., 4,088,280, Cl. 242-107.000.

Loparev, Robert Nikolaevich: *See—*
Gumen, Valery Fedorovich; Kalininskaya, Tatyana Vasilievna; Loparev, Robert Nikolaevich; and Sladkov, German Vladimirovich, 4,088,908, Cl. 310-49.00R.

Losehand, Reinhard, to Siemens Aktiengesellschaft. Two-phase charge-coupled semiconductor arrangement. 4,089,023, Cl. 357-24.000.

Losert, Wolfgang: *See—*
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,088,775, Cl. 424-278.000.

Lowder, Dale E., to Clarke-Gravely Corporation. Floor scrubber solution valve. 4,088,148, Cl. 137-625.470.

Lowe, Warren, to Chevron Research Company. Lubricating oil additive compositions. 4,088,587, Cl. 252-32.70E.

Lu, Chen-i: *See—*
Morrison, Edward Dixon; and Lu, Chen-i, 4,088,552, Cl. 204-157.10R.

Lucas Electrical Company Limited, The: *See—*
Hill, William Frank, 4,088,901, Cl. 307-236.000.

Lucas, Gary M.: *See—*
Bolon, Donald A.; Lucas, Gary M.; and Schroeter, Siegfried H., 4,088,801, Cl. 427-54.000.

Luderitz, Willy. Trifocal mirror-reflector. 4,089,047, Cl. 362-297.000.

Lukhmanov, Viktor Mikhailovich: *See—*
Komarov, Jury Ivanovich; Svirin, Dmitry Andreyanovich; Titov, Dmitry Vladimirovich; and Lukhmanov, Viktor Mikhailovich, 4,088,159, Cl. 139-194.000.

Lund, Svend Aage; Kongshavn, Erik; and Ostgaard, Erik, to Akademiet for de Tekniske Videnskaber, Svejsecentralen. Method and an apparatus for automatic electric welding. 4,088,866, Cl. 219-137.00R.

Lund, Svend Aage: *See—*
Iversen, Sven Erik; and Lund, Svend Aage, 4,088,030, Cl. 73-629.000.

Lunney, Philip: *See—*
Carr, Thomas M., 4,088,037, Cl. 74-371.000.

Mabuchi, Kenichi, to Mabuchi Motor Co., Ltd. Beauty treatment device. 4,088,128, Cl. 128-52.000.

Mabuchi Motor Co., Ltd.: *See—*
Mabuchi, Kenichi, 4,088,128, Cl. 128-52.000.

MacDonald, Donald C.: *See—*
Hall, John F.; MacDonald, Donald C.; and Holliday, Frank R., 4,088,241, Cl. 220-86.00R.

MacFarlane, James L. Portable fire escape. 4,088,201, Cl. 182-5.000.

Machida, Fujio; and Takahashi, Kazuya, to Hitachi, Ltd. Gain control circuit. 4,088,963, Cl. 330-284.000.

Maciulaitis, Vytautas K.; and Dhanani, Rasikant R., to Crane Co. Seal assembly. 4,088,299, Cl. 251-173.000.

MacLeay, Ronald Edward: *See—*
Sheppard, Chester Stephen; MacLeay, Ronald Edward; and Bafford, Richard Anthony, 4,088,642, Cl. 260-174.000.

Macrae, George: *See—*
Basdekas, Demetrios L.; Macrae, George; and Walsh, Joseph M., 4,088,182, Cl. 165-32.000.

Magdefrau, Herbert: *See—*
Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, 4,088,853, Cl. 200-19.00R.

Magidson, Galina Konstantinovna: *See—*
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

Magidson, July Onisimovich, administrators: *See—*
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

Magidson, Onisim Julievich, deceased: *See—*
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

Maiden, Donald L., to United States of America, National Aeronautics and Space Administration. Two dimensional wedge/translating shroud nozzle. 4,088,270, Cl. 239-265.250.

Makipirtti, Simo A.: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.

Malek, James R.; Speier, John L.; and Wright, Antony P., to Dow Corning Corporation. Method for preparing organosilicon compounds from elemental silicon and hydrocarbon ethers. 4,088,669, Cl. 260-448.80R.

Malkin, Irving, to Diamond Shamrock Corporation. Periodic removal of cathodic deposits by intermittent reversal of the polarity of the cathodes. 4,088,550, Cl. 204-95.000.

Mallick, George T., Jr.: *See—*
Miller, Robert C.; and Mallick, George T., Jr., 4,088,899, Cl. 307-116.000.

Malmstrom, Rolf E.: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.

Manders, Lambertus Wilhelmus Johannes, to U.S. Philips Corporation. Fluorescent lamp with superimposed luminescent layers. 4,088,923, Cl. 313-487.000.

Mann, Patrick A.: *See—*
LaBove, Larry D.; and Mann, Patrick A., 4,087,864, Cl. 2-102.000.

MAP Corporation, The: *See—*
Hard, Harold D., 4,088,194, Cl. 169-75.000.

Marconi Company Limited, The: *See—*
Jones, Edwin Vaughan, 4,088,903, Cl. 307-291.000.

Marconi, Walter: *See—*
Zappelli, Piergiorgio; Re, Luciano; and Marconi, Walter, 4,088,639, Cl. 260-112.50R.

Maringer, Albert: *See—*
Weineck, Hans; and Maringer, Albert, 4,088,916, Cl. 310-338.000.

Marinsky, Georgy Sergeevich: *See—*
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.

Marjoram, John Ernest, to Dunlop Limited. Method for molding a block of polyurethane foam having a flat upper surface. 4,088,722, Cl. 264-40.400.

Marker, Hannes: *See—*
Korger, Heinz, 4,088,345, Cl. 280-636.000.

Marquardt, Kurt, to Hager & Elsaesser. Process for the treatment of water solution by ion exchange. 4,088,563, Cl. 210-33.000.

Marr, Peter A.: *See—*
Chang, Jack C.; Marr, Peter A.; and Ciurca, Samuel J., Jr., 4,088,488, Cl. 96-29.00D.

Mars, James Robert, to Control Data Corporation. Plasma panel mounting frame. 4,089,045, Cl. 362-390.000.

Marshall, John Kerr: *See—*
Carter, Malcolm Nigel Alan; McGhee, Brian; Helliwell, John Fielden; Marshall, John Kerr; and Naik, Appayya Raghunath, 4,088,612, Cl. 252-545.000.

Marson Fastener Corporation: *See—*
Di Maio, Anthony E.; and Todisco, Joseph G., 4,088,004, Cl. 72-391.000.

Martensson, Kjell H.: *See—*
Stark, Olof S.; and Martensson, Kjell H., 4,088,260, Cl. 229-17.00R.

Martin Concrete Engineering Company: *See—*
Hight, Henry Delmar, Jr., 4,088,112, Cl. 125-2.000.

Martin, Erwin; Hoffmann, Helmut; and Brunnert, Otto, to Siemens Aktiengesellschaft. Method and apparatus for the permanent polarization of piezoelectric bodies. 4,088,917, Cl. 310-357.000.

Martin, Frederick Wight. Memory device utilizing ion beam readout. 4,088,895, Cl. 250-492.00A.

Martin, Jack Reid, to General Electric Company. Flexible interstage turbine spacer. 4,088,422, Cl. 416-198.00A.

Martinez, Donna J.: *See—*
Clayton, Donna M.; and Martinez, Donna J., 4,088,127, Cl. 128-24.100.

Maschinenbau Scholz GmbH & Co. KG: *See—*
Sikora, Harald, 4,088,952, Cl. 324-207.000.

Mascia, Anthony. Leeway angle indicator. 4,088,019, Cl. 73-180.000.

Masclet, Jean; and Veaux, Jacques, to Messier-Hispano, S.A. Shock absorber. 4,088,286, Cl. 244-102.0SL.

Mashimo, Yukio: *See—*
Date, Nobuaki; Watanabe, Yoshiaki; Sunouchi, Akio; Mashimo, Yukio; Ito, Fumio; and Ito, Tadashi, 4,089,011, Cl. 354-23.00D.

Mashkovsky, Mikhail Davydovich: *See—*
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

Mason, Jerry W.: *See—*
United States of America, National Aeronautics and Space Administration; Holley, Larry D.; and Mason, Jerry W., 4,088,951, Cl. 324-130.000.

Massachusetts Institute of Technology: *See—*
Li, Yao Tzu, 4,088,111, Cl. 124-23.00R.
Morrow, Walter E., Jr.; and Hsu, Michael S. S., 4,087,976, Cl. 60-643.000.
Whitesides, George M.; Garrett, Patricia E.; and Siegel, Merrell, 4,088,675, Cl. 260-501.210.

Massengale, John T.: *See—*
Bennington, Robert L.; and Massengale, John T., 4,088,725, Cl. 264-95.000.

Massman, Reinhart T. Wrist support for athletes. 4,088,318, Cl. 273-54.00B.

Masson, Andre: *See—*
Jourdan, Francis; Lepeytre, Jean-Paul; Masson, Andre; and Le Roux, Charles, 4,088,397, Cl. 350-253.000.

Masuda, Hideo: *See—*
Fukuda, Yoshihiko; Ishimori, Hidefumi; Toyomatsu, Masafumi; Tsubone, Masayoshi; Mizuguchi, Hideki; and Masuda, Hideo, 4,088,434, Cl. 425-467.000.

Masuhara, Toshiaki: *See—*
Asai, Shojiro; Masuhara, Toshiaki; and Kaneko, Kenji, 4,089,022, Cl. 357-23.000.

Mathevet, Albert: *See—*
Boileau, Jacques; and Mathevet, Albert, 4,088,168, Cl. 152-352.00R.

Matschke, Gunther: *See—*
Krafft, Werner; Matschke, Gunther; and Wolff, Erich, 4,088,493, Cl. 96-77.000.

Matsuda, Mitsuo: *See—*
Ishikawa, Masakazu; Shibatani, Juichi; Oka, Hiroyuki; Mitsuoka, Naomi; and Matsuda, Mitsuo, 4,088,001, Cl. 72-370.000.

Matsumoto, Norio: *See—*
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.

Matsumura, Yasuhiro; and Hata, Shigeki, to Kanto Seiki Company, Limited. Stepping motor for timekeeping mechanism. 4,088,909, Cl. 310-49.00R.

Matsushita Electric Industrial Co., Ltd.: *See—*
Hara, Tohru; Mihara, Minoru; and Toyoda, Nobuyuki, 4,088,514, Cl. 148-171.000.
Yamamoto, Yoshio; Sono, Masaki; and Ekeuti, Masahiko, 4,088,828, Cl. 174-68.500.
Yukimoto, Sadao; and Ishihara, Tadayoshi, 4,088,847, Cl. 179-115.5VC.

Matsuura, Hideki: *See—*
Akado, Hajime; Kawashima, Yutaka; Yamaguchi, Akihide; and Matsuura, Hideki, 4,087,966, Cl. 60-278.000.

Matsuzaki, Masaomi: *See—*
Matuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Humiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,088,812, Cl. 526-121.000.

Matt, Joseph; and Slovinsky, Manuel, to Nalco Chemical Company. Substituted succinic acid compounds and their use as chelants. 4,088,678, Cl. 260-502.40R.

Mattel, Inc.: *See—*
Edmisson, Russell Curtis; May, Herbert; and St. Pierre, Raymond Marie, 4,087,935, Cl. 46-202.000.
Maurer, Donald John, 4,087,931, Cl. 46-107.000.
Rosenthal, Janice Susannah; and Sapkus, Jurgis, 4,087,932, Cl. 46-40.000.
Strongin, Ned, 4,087,933, Cl. 46-44.000.

Matterstock, Karl; Langeluddeke, Peter; and Schulze, Ernst-Friedrich, to Hoechst Aktiengesellschaft. Herbicidal agents. 4,088,474, Cl. 71-108.000.

Matthews, John Wauchope: *See—*
Blakeslee, A. Eugene; and Matthews, John Wauchope, 4,088,515, Cl. 148-175.000.

Matuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Humiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, to Nippon Oil Company, Limited. Process for preparing polyolefins. 4,088,812, Cl. 526-121.000.

Matzinger, David P.: *See—*
Cooper, Anthony R.; Booth, Robin G.; and Matzinger, David P., 4,088,572, Cl. 210-23.00F.

Maurer, Donald John, to Mattel, Inc. Animated toy. 4,087,931, Cl. 46-107.000.

Maurer, Friedrich: *See—*
Chen, Yian Nian; Brugger, Marcel; Maurer, Friedrich; and Meyer, Alfred, 4,088,157, Cl. 139-1.00R.

Maurer, Fritz: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; and Hammann, Ingeborg, 4,088,758, Cl. 424-212.000.

Mavrovic, Ivo. Urea reactor effluent solution recycle in urea synthesis. 4,088,684, Cl. 260-555.00A.

Mavrovic, Ivo. Urea synthesis with improved heat recovery and conversion. 4,088,685, Cl. 260-555.00A.

Mavrovic, Ivo. Urea synthesis with improved heat recovery and conversion. 4,088,686, Cl. 260-555.00A.

Max Sandherr AG: *See—*
Schellenberg, Walter, 4,088,242, Cl. 220-258.000.

May & Baker Limited: *See—*
Caton, Michael Peter Lear; Coffee, Edward Charles John; and Watkins, Gordon Leonard, 4,088,695, Cl. 260-590.00C.
Caton, Michael Peter Lear; and Parker, Trevor, 4,088,821, Cl. 560-121.000.

May, Herbert: *See—*
Edmisson, Russell Curtis; May, Herbert; and St. Pierre, Raymond Marie, 4,087,935, Cl. 46-202.000.

Maynard, Robert Nelson; Skipper, Bobby Ray; and Millman, Nathan, to J. M. Huber Corporation. Improved method of beneficiating clay by removal of titanium and iron impurities. 4,088,732, Cl. 423-122.000.

Maytag Company, The: *See—*
Goodlaxson, John D., 4,087,994, Cl. 68-23.700.

Mazzariello, Rodolpho M., to Caprini, Joseph A. Forceps. 4,088,134, Cl. 128-321.000.

McAleer, William J.; and Wasmuth, Edward H., to Merck & Co., Inc. Hepatitis B surface antigen. 4,088,748, Cl. 424-89.000.

McCain, David L.: *See—*
Umphrey, Ronald W.; Plate, Thomas H.; McCain, David L.; and Sweeney, William T., 4,089,053, Cl. 366-349.000.

McCartney, Ronald L., to International Telephone and Telegraph Corporation. Single optical fiber connector. 4,088,390, Cl. 350-96.210.

McCoige, Bruce K., to Caterpillar Tractor Co. Back-up alarm having a modular construction. 4,088,857, Cl. 200-61.880.

McCord, Wilfred M., Jr., to Vermont American Corporation. Portable router attachment. 4,088,164, Cl. 144-252.00R.

McCullough, Robert C.: *See—*
Sgourakes, George E.; and McCullough, Robert C., 4,088,020, Cl. 73-194.0VS.

McDanel Refractory Porcelain Company: *See—*
Blaze, Joseph E., Jr., 4,088,509, Cl. 136-235.000.

McDowell, Verle A.: *See—*
Bodine, Kenneth E.; and McDowell, Verle A., 4,088,011, Cl. 73-116.000.

McElroy, David J.; Tubbs, Graham S.; and Southard, Charles J., to Texas Instruments Incorporated. Switching control circuits for electronic calculator with push-button on-off system. 4,089,062, Cl. 364-700.000.

McEowen, James Royce, to Bell Telephone Laboratories, Incorporated. Hold-plus-intercom for single-line stations. 4,088,846, Cl. 179-99.000.

McGhee, Brian: *See—*
Carter, Malcolm Nigel Alan; McGhee, Brian; Helliwell, John Fielden; Marshall, John Kerr; and Naik, Appayya Raghunath, 4,088,612, Cl. 252-545.000.

McGraw-Edison Company: *See—*
Kaebitzsch, Johannes W.; and Tuegel, John L., 4,088,067, Cl. 99-379.000.
Zwillinger, Daniel, 4,088,861, Cl. 219-10.55D.

McGuire, Joseph C., to United States of America, Energy. Radionuclide trap. 4,088,533, Cl. 176-37.000.

McIntire, John E.: *See—*
McIntire, Kendrick H.; and McIntire, John E., 4,088,113, Cl. 126-132.000.

McIntire, Kendrick H.; and McIntire, John E. Wood burning automatic swimming pool heater. 4,088,113, Cl. 126-132.000.

McIntyre, James Eric: *See—*
Browne, Anthony Arthur Briarly; and McIntyre, James Eric, 4,088,635, Cl. 260-78.410.

McLoughlin, Bernard Joseph; and Guildford, Allen John, to Imperial Chemical Industries Limited. Morpholine derivatives. 4,088,814, Cl. 542-455.000.

McNay, Steven Ralph, to Motorola, Inc. Paralleled output self-encoding keyboard. 4,088,994, Cl. 340-365.00C.

McVean, Michael T.: *See—*
Bowen, Leon O., Jr.; and McVean, Michael T., 4,088,123, Cl. 126-299.00D.

Mead Johnson & Company: *See—*
Goodnight, Kenneth C., Jr.; and Hartman, Grant H., Jr., 4,088,795, Cl. 426-598.000.

Mead, Theodore C.; and Odell, Norman R., to Texaco Inc. Transformer oil processing. 4,088,566, Cl. 208-90.000.

Meador, Lawrence Dean. Apparatus for pollenating plants. 4,087,937, Cl. 47-1.410.

Mecklenburg, Gunther, to Dynamit Nobel Aktiengesellschaft. Movable partition arrangement. 4,087,944, Cl. 52-241.000.

Medalert Corporation: *See—*
Auerbach, Albert A., 4,088,139, Cl. 128-419.0PT.

Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich. Mould for electroslag casting of faceted metal ingots. 4,088,295, Cl. 249-79.000.

Medtronic, Inc.: *See—*
Rockland, Ronald H.; and Jirak, Thomas L., 4,088,140, Cl. 128-419.0PG.

Mefford, Wayne S.: *See—*
Theeuwes, Felix; Saunders, Richard J.; and Mefford, Wayne S., 4,088,864, Cl. 219-121.0LM.

Megatech Corporation: *See—*
Basmajian, Vahan V., 4,087,927, Cl. 35-13.000.

Meininger, Fritz; Noll, Walter; and Spange, Arno, to Hoechst Aktiengesellschaft. Dyestuff composition for the dyeing or printing of cellulose fiber materials. 4,088,441, Cl. 8-1.00P.

Meisenhelder, William C.: *See—*
Skalla, Dale; Meisenhelder, William C.; and Alsberg, Henry, 4,088,617, Cl. 260-23.0ST.

Meixner, Gary Howard, to Detroit Osteopathic Hospital Corp., a part interest. X-ray film guide. 4,088,889, Cl. 250-470.000.

Melikian, Gorken: *See—*
Peters, George T.; Melikian, Gorken; and Biancardi, Frank R., 4,088,865, Cl. 219-121.00L.

Mellor, Peter Gordon, to Ferodo Limited. Flooring elements. 4,087,948, Cl. 52-180.000.

Memorex Corporation: *See—*
Adair, Henry, 4,088,278, Cl. 242-71.800.
Mentler, Sandor, to General Electric Company. High speed bus differential relay. 4,089,033, Cl. 361-110.000.
Mercier, Alain; and Fournier, Yves, to Saint-Gobain Industries. Method and apparatus for sealing the four edges of a multiple pane window. 4,088,522, Cl. 156-107.000.
Merck & Co., Inc.: *See—*
McAleer, William J.; and Wasmuth, Edward H., 4,088,748, Cl. 424-89.000.
Merkel, Paul Barrett, to Eastman Kodak Company. Heat developable photographic materials and process. 4,088,496, Cl. 96-114.100.
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Meslener, George J., to GTE Laboratories Incorporated. Method and apparatus for modulating an optical signal. 4,088,885, Cl. 250-199.000.
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Kohlen, Rudolf; Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, 4,088,455, Cl. 48-202.000.
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Meyer, Kirk J. Door security lock means with panic knob. 4,088,353, Cl. 292-36.000.
Meyers, Marion Douglas, to American Cyanamid Company. Electrochromic variable optical transmission device with a liquid electrolyte. 4,088,392, Cl. 350-357.000.
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Benthin, Johannes, 4,087,871, Cl. 4-217.000.
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Michetti, Louis C., to Container Corporation of America. Seal end carton corner construction. 4,088,263, Cl. 229-37.00R.
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Gute, Robert M., 4,088,374, Cl. 303-9.000.
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Mikhailidi, Alexandr Konstantinovich: *See—*
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Milcoy, Edgar Albert Philip, to Arrow-Hart (Europe) Limited. Housing for electrical components. 4,088,829, Cl. 174-53.000.
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Johnson, Leighton C., 4,088,797, Cl. 427-2.000.
Miles, Thomas R., to United States of America, Oregon. Field burning apparatus. 4,088,122, Cl. 126-271.20R.
Milewski, Andrzej Tadeusz, to International Business Machines Corporation. Method and apparatus for determining the initial values of the coefficients of a complex transversal equalizer. 4,089,061, Cl. 364-724.000.
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Miller, Arnold M.: *See—*
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Miller, Bradley W.; Hickenlooper, Franklin T.; Uhlrich, David C.; Godfrey, Marl D.; Clifford, Douglas M.; James, Rex L.; Watson, Robert E.; Keith, John C.; and Mortensen, Alan C., to Hewlett-Packard Company. Programmable calculator employing a read-write memory having a movable boundary between program and data storage sections thereof. 4,089,059, Cl. 364-706.000.
Miller, Joe A., to Baxter Travenol Laboratories, Inc. Molded collapsible solution container having gusset portions. 4,088,166, Cl. 150-.500.
Miller, M. L.: *See—*
DePas, Laddie A., Sr., 4,088,375, Cl. 303-96.000.
Miller, Robert C.; and Mallick, George T., Jr., to Westinghouse Electric Corp. Method for controlling an automatic machine tool. 4,088,899, Cl. 307-116.000.
Miller, Roland E.; Scaletta, Joseph A.; and Valek, John, to Kraft, Inc. Method for seaming a lid to a container pan. 4,088,086, Cl. 113-30.000.
Miller, Russell C., to J. M. Eltzroth & Associates, Inc. Coating compositions. 4,088,621, Cl. 260-29.60S.
Miller, William E.: *See—*
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Fairbanks, Charles W.; and Kistner, John F., 4,088,500, Cl. 106-35.000.
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Taylor, Allen L.; and Sheffield, William F., 4,089,034, Cl. 361-233.000.
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Ueda, Hiroshi; and Niwa, Masatake, 4,089,014, Cl. 354-38.000.
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Mitschke, Manfred; and Wallentowitz, Henning, to Robert Bosch GmbH. Guiding an untracked vehicle along a predetermined guide path. 4,088,939, Cl. 318-576.000.
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Mitsuoka, Naomi: *See—*
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Miyamoto, Koichi: *See—*
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Miyasaka, Kenzi; Murata, Mitsuhiro; and Uematsu, Hiroyuki, to Citizen

Watch Company Limited. Movement construction for small size analog quartz timepiece. 4,087,957, Cl. 58-23.00R.
Miyoshi, Mituji: *See—*
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Mobil Oil Corporation: *See—*
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Mollura, Carlos A. Inflatable aerodynamic nose cone. 4,088,362, Cl. 296-1.00S.
Monafo, William W., to Research Corporation. Water-soluble cerium (cerous) salts in burn therapy. 4,088,754, Cl. 424-131.000.
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Day, James R., 4,088,282, Cl. 242-118.200.
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Heisner, Donald N.; and Bentivegna, Charles R., 4,088,936, Cl. 318-626.000.
Stoffel, Paul J.; and Schumacher, Ignatius, 4,088,472, Cl. 71-92.000.
Montagroni, Nevio; and Roda, Cesare. Apparatus for extracting juice from citrus fruits. 4,088,070, Cl. 100-121.000.
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Moorer, Howard H., to Westvaco Corporation. Anionic bituminous emulsions. 4,088,505, Cl. 106-277.000.
Morgan, Michael W.: *See—*
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Mori, Shigeo; and Fujita, Takeshi, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Flame resistant polyurethane foam and process for producing the same. 4,088,614, Cl. 260-2.5AJ.
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Morlock, Gerhard; and Stehlik, Gerhard, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Iodophor solution. 4,088,597, Cl. 252-106.000.
Morris, Lowell H., to Morris Manufacturing Company. Mast-supported antenna mounting block. 4,089,006, Cl. 343-890.000.
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Morrison, Edward Dixon; and Lu, Chen-i, to Eastman Kodak Company. Recovering silver compounds from solutions containing other silver compounds. 4,088,552, Cl. 204-157.10R.
Morrow, Walter E., Jr.; and Hsu, Michael S. S., to Massachusetts Institute of Technology. Electric power plant using electrolytic cell-fuel cell combination. 4,087,976, Cl. 60-643.000.
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Immell, Raymond G.; and Sasser, Bill H., 4,089,005, Cl. 343-845.000.
McNay, Steven Ralph, 4,088,994, Cl. 340-365.00C.
Mott, Lambert H. Method of manufacture of tubular inertial filter. 4,088,576, Cl. 210-66.000.
Moulton, Richard B., to Nucleonic Data Systems. Radiation thickness gauge for sheet material. 4,088,886, Cl. 250-277.00R.
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Mroz, Thaddeus S.: *See—*
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Mucke, Rainer: *See—*
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Muhlemann, Hans Rudolf; and Schmid, Hans, to Gaba AG. Oral composition for plaque and caries inhibition. 4,088,752, Cl. 424-57.000.
Muller, Helmut, to Draiswerke GmbH, Firma. Method for flushing pigments in the form of water containing cakes. 4,088,577, Cl. 210-67.000.
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Muller, Klaus Peter, to A. Nattermann & Cie GmbH. Process of manufacturing enzyme preparation rich in lipase. 4,088,539, Cl. 195-66.00R.
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Murdock, Douglas B., to Resource Control Corporation. Real time data processing and display system for non-linear transducers. 4,089,058, Cl. 364-571.000.
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Nakahara, Tsuneo; Hoshikawa, Masao; Shiraishi, Satoshi; Kurosaki,

Shiro; and Fujiwara, Kunio, to Sumitomo Electric Industries, Ltd. O-Type optical waveguide. 4,088,388, Cl. 350-96.300.
Nakajima, Mikio; and Kuwabara, Kiyoaki, to Nippon Carbide Kogyo Kabushiki Kaisha. Method for clarifying aqueous waste liquids containing acid dyes. 4,088,573, Cl. 210-53.000.
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu; Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, to Hitachi, Ltd.; and Sumitomo Metal Industries, Ltd. Apparatus for transporting cylindrical steel articles. 4,088,213, Cl. 193-40.000.
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Neal, Duward Harding, to Tred-X Corporation. Method of retreading a tire with an endless premolded tread. 4,088,521, Cl. 156-96.000.
Neer, Donald A.; and Pawlowski, Harold D., to Midland-Ross Corporation. Lighting fixture. 4,088,881, Cl. 362-223.000.
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Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxymethyl-cis-4,5-didehydro-9-deoxy-9,10-didehydro-PGD_1 compounds. 4,088,690, Cl. 260-586.00R.
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Nicholson, Albert N., to Computer Ribbon Systems, Inc. Method for cleaning and re-inking printer ribbons. 4,088,800, Cl. 427-8.000.
Niemela, Toivo Isak: *See*—
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.
Niemi, Bill Howard, to Stimulation Technology, Inc. Fault circuit for stimulator. 4,088,141, Cl. 128-421.000.
Niessner, Norbert H.: *See*—
Hyatt, Robert L.; and Niessner, Norbert H., 4,088,424, Cl. 417-368.000.
Nihongi, Yutaka; and Yasuhira, Nobuo, to Kuraray Co., Ltd. Melamine resin flame-retardant fibers. 4,088,620, Cl. 260-29.4UA.
Nikoden, Joseph, Jr., to Detroit Bullet Trap Corporation. Target carrier protection system. 4,088,322, Cl. 273-105.600.
Nilsson, Goran Alfred; Edstrom, Kjell; and Wiklund, Henry. Fluid pressure operated impact mechanism. 4,088,062, Cl. 91-50.000.
Nilsson, Sven Erik Lennart: *See*—
Lilja, Jan Evert; and Nilsson, Sven Erik Lennart, 4,088,448, Cl. 23-259.000.
Nippon Air Brake Co., Ltd., The: *See*—
Nitta, Akifumi, 4,088,087, Cl. 114-150.000.
Nippon Carbide Kogyo Kabushiki Kaisha: *See*—
Nakajima, Mikio; and Kuwabara, Kiyoaki, 4,088,573, Cl. 210-53.000.
Nippon Electric Co., Ltd.: *See*—
Fujimoro, Keizo; and Ohara, Shigeharu, 4,087,924, Cl. 34-58.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Sata, Takeo; Takamura, Masayuki; Shinoda, Norio; and Hatae, Masataka, 4,087,893, Cl. 29-157.30A.
Nippon Kayaku Kabushiki Kaisha: *See*—
Ogawa, Masanobu; and Kojima, Toshitake, 4,088,822, Cl. 560-207.000.
Nippon Kogaku K.K.: *See*—
Hasegawa, Hiroshi; Ohtsubo, Yoshiaki; Watanabe, Sakuji; and Takahata, Kouichi, deceased, 4,089,013, Cl. 354-33.000.
Shimomura, Jun, 4,088,394, Cl. 350-356.000.
Nippon Oil Company, Limited: *See*—
Matuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Humiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,088,812, Cl. 526-121.000.
Nippon Pelnox Corporation: *See*—
Sakata, Nobuhiro; and Suzuki, Toshihiro, 4,088,807, Cl. 428-334.000.
Nippon Piston Ring Co., Ltd.: *See*—
Takao, Tsutomu; and Takahashi, Kentaro, 4,088,476, Cl. 75-123.0CB.
Nippon Sheet Glass Co., Ltd.: *See*—
Sakata, Nobuhiro; and Suzuki, Toshihiro, 4,088,807, Cl. 428-334.000.
Nippon Soken, Inc.: *See*—
Tanaka, Masao; Takemura, Makoto; and Ito, Nobuei, 4,088,608, Cl. 252-466.0PT.
Nippon Steel Corporation: *See*—
Nakazawa, Kichi; Okamoto, Masafumi; Tanaka, Kiyoshi; and Sakazaki, Tadashi, 4,088,513, Cl. 148-112.000.
Nippondenso Co., Ltd.: *See*—
Akado, Hajime; Kawashima, Yutaka; Yamaguchi, Akihide; and Matsuura, Hideki, 4,087,966, Cl. 60-278.000.
Nishi, Tsuneyoshi: *See*—
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.
Nishigaki, Susumu: *See*—
Muramoto, Shoichi; and Nishigaki, Susumu, 4,088,984, Cl. 340-228.00R.
Nishikawa, Masao: *See*—
Takahashi, Noriyuki; and Nishikawa, Masao, 4,087,969, Cl. 60-464.000.
Nishimura, Daikichi: *See*—
Ishida, Torao; Nishimura, Daikichi; Sugawara, Toshiaki; and Ooka, Tadaaki, 4,088,646, Cl. 544-313.000.
Nishiura, Ichiro: *See*—
Uda, Kazumi; Tamura, Motohiko; Nishiura, Ichiro; and Fujiike, Hiroshi, 4,088,465, Cl. 62-54.000.
Nissan Motor Company, Limited: *See*—
Aono, Shigeo, 4,088,095, Cl. 123-32.0EE.
Kita, Toru; and Fujishiro, Takeshi, 4,088,555, Cl. 204-195.00S.
Kosaka, Katuaki; Ueno, Zene; Ishikura, Seizo; and Chida, Atushi, 4,088,450, Cl. 23-288.00L.
Sakaki, Yoshihiro; Mitomo, Takeshi; and Nakagaki, Akitsuna, 4,088,181, Cl. 165-8.000.
Tokura, Naomi; and Okamura, Kenji, 4,088,100, Cl. 123-119.0EC.
Nitta, Akifumi, to Nippon Air Brake Co., Ltd., The. Remote control apparatus marine vessels having dual propeller shafts. 4,088,087, Cl. 114-150.000.
Nitta, Takahisa: *See*—
Kondo, Hiroyuki; Nitta, Takahisa; and Moriguchi, Yoshiro, 4,088,516, Cl. 148-187.000.
Nitto Boseki Co., Ltd.: *See*—
Shono, Hiroaki; Wakasa, Isao; Kikuchi, Toshiaki; and Noji, Toshio, 4,088,467, Cl. 65-2.000.
Nitz, Rolf-Eberhard: *See*—
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,088,764, Cl. 424-251.000.
Niwa, Masatake: *See*—
Ueda, Hiroshi; and Niwa, Masatake, 4,089,014, Cl. 354-38.000.
Nixdorf Computer AG: *See*—
Hullwegen, Josef, 4,088,906, Cl. 307-359.000.
Nobel Hoechst Chimie: *See*—
Christidis, Yani; and Schouteeten, Alain, 4,088,657, Cl. 260-332.20A.
Nobile, Alfred Francis; and Nobile, Douglas Allan. Jaws, guiding base plates and adjusting mechanism for chucks. 4,088,333, Cl. 279-60.000.
Nobile, Douglas Allan: *See*—
Nobile, Alfred Francis; and Nobile, Douglas Allan, 4,088,333, Cl. 279-60.000.
Noble, Peter M., to Westinghouse Air Brake Company. Lubricating apparatus for reducing squeal noise of a railroad car wheel when passing through a car retarder. 4,088,078, Cl. 104-26.00A.
Noguchi, Koichi, to Ricoh Co., Ltd. Toner density sensing apparatus for electrostatic copying machine. 4,088,092, Cl. 118-7.000.
Noji, Toshio: *See*—
Shono, Hiroaki; Wakasa, Isao; Kikuchi, Toshiaki; and Noji, Toshio, 4,088,467, Cl. 65-2.000.
Noll, Walter: *See*—
Meininger, Fritz; Noll, Walter; and Spange, Arno, 4,088,441, Cl. 8-1.00P.
Nopanen, Esko J., to General Electric Company. Temperature limiting circuit for electric hair dryers. 4,088,869, Cl. 219-364.000.
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela,

Toivo Isak, to Outokumpu Oy. Apparatus for suspension smelting of finely-grained oxide and or sulfide ores and concentrates. 4,088,310, Cl. 266-162.000.
Nordin, Lars-Gunnar. Unbalanced hydraulic system capable of work. 4,087,973, Cl. 60-572.000.
Nordvall, Jan: *See—*
Dahle, Orvar; Von Knorring, Folke; Nordvall, Jan; and Siby, Sture, 4,088,013, Cl. 73-141.00A.
Noren, Tore H. Tandem rack dishwashing machine. 4,088,145, Cl. 134-104.000.
Norman Offshore Services Inc.: *See—*
Norman, Robert M., 4,087,981, Cl. 61-72.400.
Norman, Robert M., to Norman Offshore Services Inc. Buoyant self-propelled underwater trenching apparatus. 4,087,981, Cl. 61-72.400.
Northern Telecom Limited: *See—*
Gumb, Beverley William, 4,088,384, Cl. 339-156.00R.
Harman, Stephen George, 4,088,967, Cl. 332-23.00R.
Norton, Ian F.; and Beekenkamp, Gerald, to Greb Industries Limited. Skate construction. 4,088,335, Cl. 280-11.180.
Norton, Richard V., to Suntech, Inc. Method of preparing honeycomb insulation structure. 4,088,723, Cl. 264-45.500.
Novello, Louis J. Artist's maulstick. 4,088,290, Cl. 248-118.500.
Nucleonic Data Systems: *See—*
Moulton, Richard B., 4,088,886, Cl. 250-277.00R.
Nychka, Henry R.; and Eibeck, Richard E., to Allied Chemical Corporation. Production of fluorocarbons employing two catalyst zones. 4,088,704, Cl. 260-653.000.
O. F. Mossberg & Sons, Inc.: *See—*
Grehl, William H., 4,087,930, Cl. 42-75.00B.
O & K Orenstein & Koppel Aktiengesellschaft: *See—*
Gradert, Arno, 4,088,304, Cl. 254-184.000.
Obenchain Corporation: *See—*
Bonistalli, Raymond J., 4,088,824, Cl. 13-9.00R.
Occidental Petroleum Corporation: *See—*
Choi, Charles K.; Gundzik, Richard M.; and Tassoney, Joseph P., 4,088,541, Cl. 202-99.000.
Ochiai, Takeshi: *See—*
Tanigawa, Kou; and Ochiai, Takeshi, 4,088,980, Cl. 340-52.00F.
O'Connor, Thomas J., to Easco-Sparcatron, Inc. Servo head structure. 4,088,032, Cl. 74-25.000.
Oda, Masataka: *See—*
Isono, Yoshihiro; and Oda, Masataka, 4,088,483, Cl. 96-1.50R.
Odell, Norman R.: *See—*
Mead, Theodore C.; and Odell, Norman R., 4,088,566, Cl. 208-90.000.
Odenwald, Gerhard: *See—*
Ratz, Adolf; Wilhelm, Adolf; Odenwald, Gerhard; Frank, Siegfried; and Stark, Walter, 4,088,047, Cl. 76-112.000.
Odenwalder, Heinrich; Puschel, Walter; and Ranz, Erwin, to Agfa-Gevaert Aktiengesellschaft. Light sensitive photographic material. 4,088,491, Cl. 96-55.000.
Oertel, Harald: *See—*
Uhrhan, Paul; Lantzsch, Reinhard; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,088,629, Cl. 260-45.80N.
O'Ffill, Joseph M., to Twenty Farms, Inc. Method and apparatus for processing oil shale. 4,088,562, Cl. 208-11.00R.
Ogawa, Masanobu; and Kojima, Toshitake, to Nippon Kayaku Kabushiki Kaisha. Simultaneous production of methacrylic acid and a methacrylate or acrylic acid and an acrylate. 4,088,822, Cl. 560-207.000.
Ogden, Cameron S.: *See—*
Fedor, Robert J.; and Ogden, Cameron S., 4,088,606, Cl. 252-465.000.
Ogura, Shinichi: *See—*
Saito, Mitsuru; Nakamura, Toshihide; and Ogura, Shinichi, 4,088,985, Cl. 340-237.00R.
O'Hanlon, Edward J. Means and methods of preventing the loss of solar heat. 4,088,119, Cl. 126-271.000.
Ohara, Shigeharu: *See—*
Fujimoro, Keizo; and Ohara, Shigeharu, 4,087,924, Cl. 34-58.000.
Ohba, Shintaro; Hirose, Nobuhiko; Sugihara, Nobuhiro; and Aikawa, Takayuki, to Kabushiki Kaisha Saneisha Seisakusho. Wire connecting sleeve. 4,087,889, Cl. 24-129.00W.
Ohkawa, Hiroshi. Apparatus for moving objects. 4,087,873, Cl. 5-81.00B.
Ohno, Yukio: *See—*
Suzuki, Teruki; Tanimizu, Shinkichi; and Ohno, Yukio, 4,088,599, Cl. 252-301.40F.
Ohta, Koji: *See—*
Yamamoto, Eiji; and Ohta, Koji, 4,088,029, Cl. 73-612.000.
Ohtake, Shinzaburo: *See—*
Igaraahi, Toshiji; and Ohtake, Shinzaburo, 4,088,778, Cl. 424-284.000.
Ohtsubo, Yoshiaki: *See—*
Hasegawa, Hiroshi; Ohtsubo, Yoshiaki; Watanabe, Sakuji; and Takahata, Kouichi, deceased, 4,089,013, Cl. 354-33.000.
Oil States Rubber Company: *See—*
Landers, Don B., 4,087,978, Cl. 61-53.000.
Oiles Industry Co., Ltd.: *See—*
Kubo, Shinsuke; and Kuzunishi, Hiroyuki, 4,088,156, Cl. 138-109.000.
Oka, Hiroyuki: *See—*
Ishikawa, Masakazu; Shibatani, Juichi; Oka, Hiroyuki; Mitsuoka, Naomi; and Matsuda, Mitsuo, 4,088,001, Cl. 72-370.000.
Okada, Noboru: *See—*
Murase, Yoshitaka; Okada, Noboru; Yoshikawa, Iwashiro; Takeuchi, Tsutomu; and Yamashita, Hisakuni, 4,088,527, Cl. 156-502.000.
Okamoto, Masafumi: *See—*
Nakazawa, Kichi; Okamoto, Masafumi; Tanaka, Kiyoshi; and Sakazaki, Tadashi, 4,088,513, Cl. 148-112.000.
Okamura, Kenji: *See—*
Tokura, Naomi; and Okamura, Kenji, 4,088,100, Cl. 123-119.0EC.
Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, to Ricoh Co., Ltd. Derivatives of 1,3,4-oxadiazole and electrophotographic elements containing same. 4,088,484, Cl. 96-1.50R.
Okuyama, Toshiaki; and Kubota, Yuzuru, to Hitachi, Ltd. Control system for commutatorless motor. 4,088,932, Cl. 318-138.000.
Olges, Laurence T., to General Electric Company. Clothes dryer air flow test device and method. 4,088,017, Cl. 73-168.000.
Olin Corporation: *See—*
Godfrey, John N., 4,088,728, Cl. 264-167.000.
Tyler, Derek E.; Dickinson, David W.; Dore, James E.; and Khan, Abid A., 4,088,475, Cl. 75-76.000.
Ollendorf, Joel; and Cestone, Frank J., to RCA Corporation. Method of performing contactless photolithography. 4,088,406, Cl. 355-132.000.
Olsson, Hans, to Hans Olssons Mekaniska Verkstad AB. Method and device for holing. 4,088,048, Cl. 83-55.000.
Omron Tateisi Electronics Co.: *See—*
Hirano, Masao, 4,088,393, Cl. 350-350.000.
Omura, Takayosi: *See—*
Habu, Teiji; Korematsu, Shinobu; Wada, Tsuneo; Omura, Takayosi; Ishii, Hiroki; and Sasaki, Takashi, 4,088,495, Cl. 96-111.000.
O'Neill, William J., to Victory Engineering Corporation. Balloon catheter with coaxial activating syringe. 4,088,135, Cl. 128-348.000.
Ooka, Tadaaki: *See—*
Ishida, Torao; Nishimura, Daikichi; Sugawara, Toshiaki; and Ooka, Tadaaki, 4,088,646, Cl. 544-313.000.
Orlando, Carl, to United States of America, Army. Rapid access dry photographic system. 4,089,016, Cl. 354-75.000.
Osaka, Akira: *See—*
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu; Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, 4,088,213, Cl. 193-40.000.
Osborne, Edward L., to Westvaco Corporation. Container for trash compactor. 4,088,261, Cl. 229-26.000.
Osborne-Hoffman, Inc.: *See—*
Osborne, Paul Wray, 4,088,960, Cl. 328-144.000.
Osborne, Paul Wray, to Osborne-Hoffman, Inc. Monolithically integrable correlation detector. 4,088,960, Cl. 328-144.000.
Oshimi, Humiaki: *See—*
Matuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Humiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,088,812, Cl. 526-121.000.
Ostgaard, Erik: *See—*
Lund, Svend Aage; Kongshavn, Erik; and Ostgaard, Erik, 4,088,866, Cl. 219-137.00R.
Ott, Albert. Device for measuring the thickness of layers with a radionuclide irradiating the layer. 4,089,054, Cl. 364-527.000.
Ott, Karl: *See—*
Borst, Wolfgang; and Ott, Karl, 4,088,106, Cl. 123-146.50D.
Ousset, Robert Andre: *See—*
Kehren, Jean-Paul Andre; and Ousset, Robert Andre, 4,088,518, Cl. 149-11.000.
Outboard Marine Corporation: *See—*
Rose, Edgar; and Wlezien, Richard A., 4,088,098, Cl. 123-73.00A.
Outokumpu Oy: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.
Owens-Corning Fiberglas Corporation: *See—*
Roberson, Cletis L., 4,088,468, Cl. 65-3.00R.
Owens-Illinois, Inc.: *See—*
Amberg, Stephen W.; and Doherty, Thomas E., 4,088,526, Cl. 156-446.000.
Uhlig, Albert R., 4,088,239, Cl. 220-5.00R.
Owens, Lester J., to United States of America, National Aeronautics and Space Administration. Ocean thermal plant. 4,087,975, Cl. 60-641.000.
Oxy Metal Industries Corporation: *See—*
Deuber, John Martin; and Stevens, Peter, 4,088,549, Cl. 204-43.00G.
Oy Tampella Ab: *See—*
Lamminen, Veikko, 4,088,531, Cl. 162-352.000.
P.N. Patrick Company, Inc.: *See—*
Swinehart, Robert L.; and Patrick, Paul N., 4,088,560, Cl. 204-297.00W.
Paasikivi, Erkki Jalmari, to K. Oras OY. Single-handled mixing valve. 4,088,153, Cl. 137-625.170.
Pacakova, Zdena: *See—*
Vlcek, Karel; Pacakova, Zdena; Jirka, Bohuslav; Cesenek, Bedrich; and Jindra, Karel, 4,088,226, Cl. 209-82.000.
Pacala, Thomas J.: *See—*
Lauderslager, James B.; and Pacala, Thomas J., 4,088,965, Cl. 331-94.50G.
Pacific Waste Equipment Corporation: *See—*
Cruse, Harry R.; and Copenhagen, Richard I. (said Richard I. Copenhagen assors. to), 4,088,071, Cl. 100-245.000.

Package Machinery Company: *See*—
Farrell, Robert E., 4,088,432, Cl. 425-451.600.

Packer, Poley N.: *See*—
United States of America, National Aeronautics and Space Administration; Zebus, Paul P.; Packer, Poley N.; and Haynie, Cyrus C., 4,088,312, Cl. 269-21.000.

Paget, Charles J.; and Sands, John L., to Eli Lilly and Company. N-heterocyclic ureas as immune regulants. 4,088,768, Cl. 424-270.000.

Paget, Charles J., Jr., to Eli Lilly and Company. Substituted 2-anilinobenzoxazoles used as immunosuppressive agents. 4,088,770, Cl. 424-272.000.

Paille, Wilbrod Alfred, to General Electric Company. Method and apparatus for correcting distortion in gas turbine engine blades. 4,087,996, Cl. 72-38.000.

Paladino, C. Alfred, to International Telephone and Telegraph Corporation. System for selectively operable dual simultaneous siren broadcast from a single speaker. 4,088,995, Cl. 340-384.00E.

Pallant, Joseph; and Johndrow, John Paul, to H. R. Turner (Willenhall) Ltd. Seat slide including resiliently deformable element. 4,088,378, Cl. 308-3.00R.

Pallaver, Carl B.; and Morgan, Michael W., to United States of America, Energy. Cryogenic expansion machine. 4,087,988, Cl. 62-514.0JT.

Palm, John W.: *See*—
Reed, Robert L.; Palm, John W.; and Ruth, Ralph G., 4,088,744, Cl. 423-573.00G.

Palmer, Dean. Truck camper tent. 4,088,363, Cl. 296-23.0MC.

Palmer, John M., Jr. Floating pool assembly. 4,087,870, Cl. 4-171.000.

Pan, Peter Naw Yank, to Continental Can Company, Inc. Web coating and powder feed. 4,088,093, Cl. 118-630.000.

Parise & Sons, Inc.: *See*—
Laule, Thomas M.; and Blackman, R. Eugene, 4,088,462, Cl. 55-437.000.

Parker-Hannifin Corporation: *See*—
Grahl, Darwin R., 4,087,986, Cl. 62-189.000.

Parker, Trevor: *See*—
Caton, Michael Peter Lear; and Parker, Trevor, 4,088,821, Cl. 560-121.000.

Parmer, Kenneth Ronald: *See*—
Cobaugh, Robert Franklin; and Parmer, Kenneth Ronald, 4,087,906, Cl. 29-630.00D.

Parmer, Laurence Pierpont. Method of obtaining a splenic composition which inhibits platelet function and said composition. 4,088,753, Cl. 424-95.000.

Parr, Erfried: *See*—
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,088,593, Cl. 252-89.00R.

Pastor, Jose. Radiant energy collector. 4,088,116, Cl. 126-270.000.

Patrick, Paul N.: *See*—
Swinehart, Robert L.; and Patrick, Paul N., 4,088,560, Cl. 204-297.00W.

Patten, Edgar W. Automotive vehicle body and frame straightening apparatus. 4,088,006, Cl. 72-457.000.

Patton, Bobbie J.; and Harrell, John W., to Mobil Oil Corporation. Automatically controlled desurging system. 4,088,154, Cl. 138-30.000.

Paul, Cornelis, to AB Volvo Penta. Device for connecting either one of two alternative operating members with an operated member. 4,088,038, Cl. 74-479.000.

Paulsen, Donald E., to Boeing Company, The; and Aeritalia S.p.A. Electrical/electronic rack and plug-in modules therefor. 4,089,040, Cl. 361-383.000.

Pawlowski, Harold D.: *See*—
Neer, Donald A.; and Pawlowski, Harold D., 4,088,881, Cl. 362-223.000.

Pearl, Harry A., to United States of America, Navy. Molded drag reduction coatings. 4,088,622, Cl. 260-32.80R.

Pearl, Harry A., to United States of America, Navy. Coatings that reduce flow resistance and turbulent drag at their interface with liquids. 4,088,623, Cl. 260-37.0AL.

Pearlson Engineering Company, Inc.: *See*—
Pearlson, Raymond, 4,087,979, Cl. 61-65.000.

Pearlson, Raymond, to Pearlson Engineering Company, Inc. Drydock lifting platform. 4,087,979, Cl. 61-65.000.

Pearson, Hilding A. Spring actuated woodworking clamp. 4,088,313, Cl. 269-88.000.

Pecoraro, Joseph Michael, to Du Pont de Nemours, E. I., and Company. Polyisobutyl carboxylic acid amides. 4,088,588, Cl. 252-51.50A.

Pellegri, Alberto; and Santi, Rinaldo, to Diamond Shamrock Technologies, S.A. Monitoring moving particle electrodes. 4,088,556, Cl. 204-222.000.

Pendlington, Sydney: *See*—
Bevan, David William; Clarke, Michael Willam; Haisman, Derek Robin; and Pendlington, Sydney, 4,088,790, Cl. 426-96.000.

Pendy, William John, Jr.: *See*—
Castrodale, Daniel Owen; Pendy, William John, Jr.; and Wentink, William Stewart, 4,089,029, Cl. 360-99.000.

Pennwalt Corporation: *See*—
Sheppard, Chester Stephen; MacLeay, Ronald Edward; and Bafford, Richard Anthony, 4,088,642, Cl. 260-174.000.

Peripheral Dynamics, Inc.: *See*—
Garczynski, John S., 4,088,265, Cl. 235-454.000.

Perkins, William C., to Rockwell International Corporation. Method and apparatus for synchronously detecting a differentially encoded carrier signal. 4,088,957, Cl. 325-320.000.

Perper, Lloyd J. Variable permanent magnet suspension system. 4,088,379, Cl. 308-10.000.

Perry, Francis James; and Vesci, Anthony, to International Business Machines Corporation. Digital flow pressure regulator. 4,089,007, Cl. 346-140.00R.

Perry, Kenneth E., to Winfield Brooks Company. Method of abrading or having a restricted passage surface. 4,087,943, Cl. 51-317.000.

Perry, Stephen F.; and Hall, Ralph R., to Exxon Research & Engineering Co. Dehydrating process for ketone dewaxing solvents. 4,088,564, Cl. 208-33.000.

Persson, Per Oskar, to Ingenjorsfirman Per Oskar Persson AB. Method for making animal feed from manure. 4,088,796, Cl. 426-641.000.

Pertot, Alfred G.: *See*—
Cecere, Anthony, 4,088,175, Cl. 164-63.000.

Peters, George T.; Melikian, Gorken; and Biancardi, Frank R., to United Technologies Corporation. Laser beam welding apparatus. 4,088,865, Cl. 219-121.00L.

Petersen, Rudolf, to Beiersdorf Aktiengesellschaft. 4 Alpha- and 4 beta-amino-4-desoxyoleandrins, and pharmaceutical composition containing same. 4,088,757, Cl. 424-182.000.

Peterson, Phillip R.: *See*—
Berntsen, Peter; and Peterson, Phillip R., 4,087,945, Cl. 52-103.000.

Petrolite Corporation: *See*—
Quinlan, Patrick M., 4,088,574, Cl. 210-58.000.

Pfaff Industriemaschinen GmbH: *See*—
Hager, Walter, 4,088,085, Cl. 112-121.120.

Pfeiffer, Peter: *See*—
Gallitzendorfer, Josef; Pfeiffer, Peter; Tomforde, Johann; and Gotz, Hans, 4,088,366, Cl. 296-154.000.

Phillips, Manio L.: *See*—
Aliment, Lindy; and Phillips, Manio L., 4,088,294, Cl. 248-519.000.

Phillips Petroleum Company: *See*—
Gaines, Larry D., 4,088,740, Cl. 423-359.000.
Giles, Richard F., 4,088,430, Cl. 425-144.000.
Holtz, Hans D.; and Gardner, Lloyd E., 4,088,823, Cl. 560-236.000.
Schirmer, Robert M., 4,087,963, Cl. 60-39.230.
Willis, Daniel H., 4,088,813, Cl. 526-173.000.

Phillips, Raymond Jeffrey: *See*—
Cowley, David; and Phillips, Raymond Jeffrey, 4,088,200, Cl. 182-2.000.

Phillips, Ronald Alfred, to Eastman Kodak Company. Synchronous stacking device. 4,088,314, Cl. 271-176.000.

Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, to Dresser Industries, Inc. Degasification system. 4,088,457, Cl. 55-194.000.

Pickenhagen, Wilhelm: *See*—
Smith, Alistair Y.; Dietrich, Paul; and Pickenhagen, Wilhelm, 4,088,649, Cl. 544-385.000.

Pickering, Keldon S.: *See*—
Hasslinger, Russell; and Pickering, Keldon S., 4,088,136, Cl. 128-349.00R.

Pickus, Milton R.; and Ciardella, Robert L., to United States of America, Energy. Quench-age method for the fabrication of niobium-aluminum superconductors. 4,088,512, Cl. 148-11.50F.

Pierce, Zona Reynolds: *See*—
Brust, David Philip; Chen, Tsang Jan; Ponticello, Ignazio Salvatore; and Pierce, Zona Reynolds, 4,088,499, Cl. 96-29.00D.

Pieters, Wim Johan Meindert; Gates, William Ellis; Carlson, Emery John; and Wilkalis, John Edward, to Allied Chemical Corporation. Catalyst and process for the production of chlorofluorinated hydrocarbons. 4,088,705, Cl. 260-653.700.

Pilkington Brothers Limited: *See*—
Ellis, Edric; Gelder, Richard; and Hale, Allan, 4,088,501, Cl. 106-52.000.
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,088,471, Cl. 65-182.00R.

Pioneer Electronic Corporation: *See*—
Kodama, Akihiko, 4,088,915, Cl. 310-334.000.

Pioneer Heddle and Reed Company Incorporated: *See*—
Kennedy, William P., 4,088,158, Cl. 139-92.000.

Piper F.M. Limited: *See*—
Brown, Peter John Raymond, 4,088,103, Cl. 123-141.000.

Pitney-Bowes, Inc.: *See*—
Rudd, Robert W.; and Holodnak, Richard S., 4,088,402, Cl. 355-3.0DD.

Pittet, Alan O.: *See*—
Schreiber, William L.; and Pittet, Alan O., 4,088,696, Cl. 260-601.00R.

Piziali, Robert L.: *See*—
Korner, Anneliese F.; Piziali, Robert L.; and Ellsworth, Orval T., 4,088,124, Cl. 128-1.00B.

Plate Bonn Gesellshaft mit Beschrankter Haftung: *See*—
Beck, Theodor; and Gross, Friedrich, 4,088,789, Cl. 426-9.000.

Plate, Thomas H.: *See*—
Umphrey, Ronald W.; Plate, Thomas H.; McCain, David L.; and Sweeney, William T., 4,089,053, Cl. 366-349.000.

Plavskikh, Vladimir Dmitrievich: *See*—
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.

Plumadore, John D., to Scott Paper Company. Corona charging apparatus and method. 4,088,892, Cl. 250-325.000.

Plunguian, Mark: *See—*
Cornwell, Charles E.; and Plunguian, Mark, 4,088,804, Cl. 428-220.000.
Cornwell, Charles E.; and Plunguian, Mark, 4,088,808, Cl. 428-409.000.
Plunkett, Allan Barr: *See—*
D'Atre, John Douglas; Lipo, Thomas Anthony; and Plunkett, Allan Barr, 4,088,934, Cl. 318-227.000.
D'Atre, John Douglas; and Plunkett, Allan Barr, 4,088,935, Cl. 318-227.000.
Podolsky, Leaman B.; Groves, Charles L., Jr.; and Johnson, Steven J., to Westinghouse Electric Corp. Optimum sequential valve position indication system for turbine power plant. 4,088,875, Cl. 364-494.000.
Pohm, Arthur V.: *See—*
United States of America, National Aeronautics and Space Administration; Debnam, William J., Jr.; Fales, Carl L., Jr.; Breckenridge, Roger A.; and Pohm, Arthur V., 4,088,954, Cl. 324-249.000.
Polad, Michael D.: *See—*
LaManna, Richard J.; Drillick, Jacob H.; and Polad, Michael D., 4,088,216, Cl. 400-130.000.
Polaroid Corporation: *See—*
Bloom, Stanley M.; and Rogers, Howard G., 4,088,487, Cl. 96-29.00D.
Buldini, Daniel A., 4,089,017, Cl. 354-81.000.
Pollock, Alexander. Dual purpose security shutter and awning assembly. 4,088,172, Cl. 160-193.000.
Pond, George R.: *See—*
Hindin, Saul G.; and Pond, George R., 4,088,435, Cl. 431-7.000.
Ponticello, Ignazio Salvatore: *See—*
Brust, David Philip; Chen, Tsang Jan; Ponticello, Ignazio Salvatore; and Pierce, Zona Reynolds, 4,088,499, Cl. 96-29.00D.
Pope, John Anthony; and Andrews, Timothy Douglas, to Imperial Chemical Industries Limited. Diazotype materials with hydroxypropyl cellulose ether as anti-slip material. 4,088,492, Cl. 96-75.000.
Popov, Gennady Petrovich; Mikhailidi, Alexandr Konstantinovich; Lavrentiev, Konstantin Andreevich; Popov, Ivan Grigorievich; Zhukov, Viktor Vasilievich; and Sorokin, Nikolai Alexeevich. Current-conducting film for electric resistance heaters. 4,088,609, Cl. 252-512.000.
Popov, Ivan Grigorievich: *See—*
Popov, Gennady Petrovich; Mikhailidi, Alexandr Konstantinovich; Lavrentiev, Konstantin Andreevich; Popov, Ivan Grigorievich; Zhukov, Viktor Vasilievich; and Sorokin, Nikolai Alexeevich, 4,088,609, Cl. 252-512.000.
Popov, Vadim Likarionovich: *See—*
Demin, Alexandr Viktorovich; Balezin, Igor Nikolaevich; Kosinsky, Konstantin Alexeevich; Serebrennikov, Vladimir Nikolaevich; Popov, Vadim Likarionovich; Shipkov, Nikolai Nikolaevich; and Dovguchits, Eduard Fedorovich, 4,088,503, Cl. 106-56.000.
Popp, Walter: *See—*
Gubisch, Erwin; Kudlich, Walter; Popp, Walter; and Reinicke, Herbert, 4,088,625, Cl. 260-42.000.
Porshce AG: *See—*
Gruden, Dusan, 4,088,099, Cl. 123-75.00B.
Post Office, The: *See—*
Rogers, Alastair Stanley; and Thurlow, Norman Thorogood, 4,088,843, Cl. 179-70.000.
Potma, Theodorus Gerhardus; Bijkerk, Egbertus Nicolaas; and Quirijnen, Marius, to U.S. Philips Corporation. Device for printing data. 4,088,256, Cl. 226-74.000.
Powell, Charles E. Solar heating system. 4,088,115, Cl. 126-270.000.
Powell, Mark Vernon: *See—*
Duke, Peter James; Leff, Jerry; Liclican, Leo Calica; and Powell, Mark Vernon, 4,088,490, Cl. 96-36.200.
PPG Industries Canada Ltd.: *See—*
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, 4,088,551, Cl. 204-129.000.
PPG Industries, Inc.: *See—*
DeTorre, Robert P., 4,088,255, Cl. 225-98.000.
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, 4,088,551, Cl. 204-129.000.
Schaefer, William L., 4,088,469, Cl. 65-5.000.
Tsai, Yih-Wan, 4,088,180, Cl. 165-1.000.
Pradal, Bortolo Mario; and Buess, Paul Lawrence, to RCA Corporation. Frequency linearization and sensitivity equalization of a frequency modulated crystal oscillator. 4,088,968, Cl. 332-26.000.
Prater, Earle F., to Roofing Equipment, Inc. Oscillating mechanism for stripping machine. 4,088,369, Cl. 299-37.000.
Precision Industries, Inc.: *See—*
Herrmann, Frank P., 4,087,942, Cl. 49-501.000.
Precision Monolithics, Inc.: *See—*
Comer, Donald T., 4,088,905, Cl. 307-358.000.
Prescher, Gunter; Weiberg, Otto; Waldmann, Helmut; and Seifert, Hermann, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler; and Bayer Aktiengesellschaft. Process for the preparation of perpropionic acid solutions. 4,088,679, Cl. 260-502.00R.
Prescher, Gunter: *See—*
Hofen, Willi; Prescher, Gunter; Siekmann, Gerd; and Wolf, Gunter, 4,088,676, Cl. 260-502.00R.
Prigorovsky, Igor Alexandrovich; Ignatiev, Anatoly Denisovich; Shkolnik, Vladimir Emmanuilovich; Khutoretsky, Garri Mikhailovich; Vorontsov, Alexandr Ivanovich; and Fridman, Vladimir Markovich. Electrical machine stator. 4,088,913, Cl. 310-260.000.
Procter & Gamble Company, The: *See—*
Williams, Michael Kevin, 4,088,598, Cl. 252-135.000.
Proctor, Douglas Ben Ian. Pivotable rudder and means for securing in various positions. 4,088,088, Cl. 114-165.000.
Products International Company: *See—*
Twentier, Max E., 4,088,133, Cl. 128-303.130.
Produits Chimiques Ugine Kuhlmann: *See—*
Le Pape, Alain Yves, 4,088,650, Cl. 260-282.000.
Proll Molding Co., Inc.: *See—*
Appel, Mel, 4,088,050, Cl. 84-267.000.
Pudras, Horst, to G.A.O. Gesselschaft fur Automation und Organisation mbH. Device with functional units housed in an armored box and in need of protection, e.g. automatic money-dispensing machine. 4,088,082, Cl. 109-53.000.
Purvis, Michael J.: *See—*
Krechel, Joseph L.; and Purvis, Michael J., 4,088,147, Cl. 137-223.000.
Puschel, Walter: *See—*
Odenwalder, Heinrich; Puschel, Walter; and Ranz, Erwin, 4,088,491, Cl. 96-55.000.
Pustka, Karel; and Vondrovsky, Gabriel, to Agfa-Gevaert Aktiengesellschaft. Apparatus for moving component parts in photographic copying machines or the like. 4,088,405, Cl. 355-71.000.
Puurunen, Juhani. Method for the separation and recovery of furfural and organic volatile acids, such as acetic acid and formic acid, from the process of preparation of furfural. 4,088,660, Cl. 260-347.900.
Pye, David S.: *See—*
Fischer, Paul W.; Holm, LeRoy W.; and Pye, David S., 4,088,190, Cl. 166-274.000.
Pyle, Delbert E.; Pye, David S.; and Fischer, Paul W., 4,088,583, Cl. 252-8.50A.
Pyle, Delbert E.; Pye, David S.; and Fischer, Paul W., to Union Oil Company of California. Composition and method for drilling high temperature reservoirs. 4,088,583, Cl. 252-8.50A.
Quinlan, Patrick M., to Petrolite Corporation. Employing methylene phosphonates of oxyalkylated polyalkylene polyamines in chelation and/or scale inhibition. 4,088,574, Cl. 210-58.000.
Quirijnen, Marius: *See—*
Potma, Theodorus Gerhardus; Bijkerk, Egbertus Nicolaas; and Quirijnen, Marius, 4,088,256, Cl. 226-74.000.
R. Alkan & Cie.: *See—*
Hasquenoph, Jean H.; and Coutin, Pierre F., 4,088,287, Cl. 244-137.00R.
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, to Cassella Farbwerke Mainkur Aktiengesellschaft. Pharmaceutically active derivatives of 1-phenoxy-3-amino-propan-2-ol. 4,088,764, Cl. 424-251.000.
Rabatin, Jacob G., to General Electric Company. (Ba,Sr)F, (Cl,Br) : Eu^{+2} X-Ray image converters utilizing LaOBr (Tm,Tb) phosphors. 4,088,894, Cl. 250-483.000.
Raceway Components, Inc.: *See—*
Kohaut, John E., 4,088,827, Cl. 174-48.000.
Radici, Pierino; Erini, Pietro; Santini, Umberto; and Colombo, Paolo, to Societa Italiana Resine S.I.R. S.p.A. Process for the recovery of formaldehyde present in waste waters. 4,088,818, Cl. 544-186.000.
Raduchel, Bernd: *See—*
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,088,775, Cl. 424-278.000.
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, to PPG Industries, Inc.; and PPG Industries Canada Ltd. Electrolytic cell and method of electrolysis. 4,088,551, Cl. 204-129.000.
Rafa Laboratories Ltd.: *See—*
Grundman, Lea, 4,088,749, Cl. 424-12.000.
Raffa, Joseph Anthony: *See—*
Lee, James Patrick, Jr.; Raffa, Joseph Anthony; Sansone, Frank Peter; and Stochel, Nathan Harold, 4,089,051, Cl. 364-200.000.
Ramesohl, Hubert: *See—*
Deussner, Herbert; Ramesohl, Hubert; and Herchenbach, Horst, 4,088,438, Cl. 432-106.000.
Ramos, Dennis. Ribbon dispenser. 4,088,275, Cl. 242-55.300.
Rangaire Corporation: *See—*
Bowen, Leon O., Jr.; and McVean, Michael T., 4,088,123, Cl. 126-299.00D.
Rank Organisation Limited, The: *See—*
Millward, John David; Wilsher, Brian; and Mumford, Ronald, 4,088,399, Cl. 352-27.000.
Ranz, Erwin: *See—*
Odenwalder, Heinrich; Puschel, Walter; and Ranz, Erwin, 4,088,491, Cl. 96-55.000.
Raschack, Manfred: *See—*
Cyrus, Richard; and Raschack, Manfred, 4,088,763, Cl. 424-250.000.
Rast, Howard E.; and Caspers, Hubert H., to United States of America, Navy. Wide aperture optical communications detector. 4,088,884, Cl. 250-199.000.
Ratz, Adolf; Wilhelm, Adolf; Odenwald, Gerhard; Frank, Siegfried; and Stark, Walter, to Andreas Stihl Maschinenfabrik. Method of producing cutting teeth for a chain saw. 4,088,047, Cl. 76-112.000.
Rauland-Borg Corporation: *See—*
Thurmond, George R.; and Heinz, Harro K. (said Harro K. Heinz assors. to), 4,088,835, Cl. 179-1.0FS.

Rautenstrauch, Valentin, to Firmenich S.A. Process for the preparation of alkyl γ, δ-unsaturated carboxylates. 4,088,664, Cl. 260-410.90R.
Rautiola, Norman A.: *See—*
Bull, Dale L.; and Rautiola, Norman A., 4,089,048, Cl. 362-338.000.
Rawls, Lucien E., to Westinghouse Electric Corp. System for detecting nuclear explosions. 4,088,998, Cl. 343-112.00R.
Rayburn, Charles C., to Illinois Tool Works Inc. Pleated metallized film capacitors. 4,089,037, Cl. 361-305.000.
Raytheon Company: *See—*
Fassett, Matthew; Hansen, Russell W.; Toth, John F.; and Ventresca, Pietro, 4,088,970, Cl. 333-31.00R.
RCA Corporation: *See—*
Dresner, Joseph; and Goldstein, Bernard, 4,088,510, Cl. 148-6.300.
Farmer, Felta Carl, Jr., 4,088,947, Cl. 324-51.000.
Haferl, Peter Eduard, 4,088,931, Cl. 315-371.000.
Levene, Martin Lewis, 4,088,867, Cl. 219-216.000.
Miko, Sandor, 4,088,942, Cl. 323-60.000.
Ollendorf, Joel; and Cestone, Frank J., 4,088,406, Cl. 355-132.000.
Pradal, Bortolo Mario; and Buess, Paul Lawrence, 4,088,968, Cl. 332-26.000.
Siekanowicz, Wieslaw Wojciech; Anderson, Charles Hammond; and Credelle, Thomas Lloyd, 4,088,920, Cl. 313-422.000.
Wheatley, Carl Franklin, Jr., 4,088,941, Cl. 323-8.000.
Re, Luciano: *See—*
Zappelli, Piergiorgio; Re, Luciano; and Marconi, Walter, 4,088,639, Cl. 260-112.50R.
Ream, Ronald L.; and Moore, David M., to Wm. Wrigley Jr. Company. Saliva stimulating chewing gum composition. 4,088,788, Cl. 426-3.000.
Rector, Douglas L.: *See—*
Callahan, William A.; Glenn, Eldridge Myles; and Rector, Douglas L., 4,088,766, Cl. 424-263.000.
Redda, Kinfe: *See—*
Knaus, Edward E.; Redda, Kinfe; and Wandelmaier, Frank Wilhelm, 4,088,653, Cl. 260-295.0AM.
Redding, Arnold H.: *See—*
Cohen, Paul; and Redding, Arnold H., 4,087,985, Cl. 60-644.000.
Redetzky, Wolfgang: *See—*
Roos, Ernst; Langner, Gunter; Kempermann, Theo; and Redetzky, Wolfgang, 4,088,630, Cl. 260-45.80A.
Reece, Jack E.: *See—*
Brown, Harvey A.; and Reece, Jack E., 4,088,497, Cl. 96-114.100.
Reed, Robert L.; Palm, John W.; and Ruth, Ralph G., to Standard Oil Company (Indiana). Increased preheating of sulfur plant gases. 4,088,744, Cl. 423-573.00G.
Reekstin, John P., Jr.: *See—*
Elkins, Perry E.; Jones, A. Brooke; and Reekstin, John P., Jr., 4,088,896, Cl. 250-505.000.
Rees, James D.; and Hemphill, Kent W., to Xerox Corporation. Optical system for alternatively projecting adjacent images of adjacent objects or double images of a single object. 4,088,401, Cl. 353-122.000.
Reese, Arthur, Sr. Retractable crop gathering finger construction. 4,087,954, Cl. 56-119.000.
Refeka Werbemittel GmbH: *See—*
Ruger, Walther, 4,087,929, Cl. 40-488.000.
Regalbuto, John A., to General Dynamics Corporation. Apparatus and method for vacuum hot press joining, compacting and treating of materials. 4,088,258, Cl. 228-193.000.
Rege, Satish Laxmanrao, to Burroughs Corporation. Error correcting circuits and methods for shift register type memories. 4,088,876, Cl. 235-312.000.
Reid, F. Joseph: *See—*
Kim, Han J.; Reid, F. Joseph; and Scimeca, Frederick J., 4,088,480, Cl. 75-200.000.
Reinecke, Erich: *See—*
Lindemann, Klaus; Reinecke, Erich; and Weise, Lutz, 4,088,376, Cl. 303-96.000.
Reinhardt, Robert M.: *See—*
Kullman, Russell M. H.; and Reinhardt, Robert M., 4,088,443, Cl. 8-116.00P.
Reinicke, Herbert: *See—*
Gubisch, Erwin; Kudlich, Walter; Popp, Walter; and Reinicke, Herbert, 4,088,625, Cl. 260-42.000.
Reluxtrol Company, The: *See—*
Sarian, Suren, 4,088,953, Cl. 324-232.000.
Remington Arms Company, Inc.: *See—*
Nasypany, Paul, 4,088,057, Cl. 89-1.701.
Renaudin, Yves: *See—*
Lalanne, Alain; and Renaudin, Yves, 4,088,845, Cl. 179-18.0GE.
Research Corporation: *See—*
Monafo, William W., 4,088,754, Cl. 424-131.000.
Resler, Glen Leroy; and Schlatter, Gerald Lance. Fluid leak alarm system. 4,088,987, Cl. 340-242.000.
Resource Control Corporation: *See—*
Murdock, Douglas B., 4,089,058, Cl. 364-571.000.
Ressorts du Nord S.A.: *See—*
Duchemin, Michel, 4,088,267, Cl. 238-349.000.
Rex-Rotary International A.S.: *See—*
Zeuthen, Karl Gustav, 4,088,868, Cl. 219-216.000.
Rhone-Poulenc Industries: *See—*
Baget, Jean; and Hucherot, Jean-Jacques, 4,088,774, Cl. 424-274.000.
Bargain, Michel; and Lefort, Marcel, 4,088,670, Cl. 260-448.20Q.
Berger, Christian; Farge, Daniel; and Moutonnier, Claude, 4,088,761, Cl. 424-246.000.
Rhone-Poulenc-Textile: *See—*
Gre, Michel Jean, 4,087,956, Cl. 57-58.540.
Isoard, Bernard, 4,088,010, Cl. 73-37.700.
Riccitiello, Salvatore R.: *See—*
Sawko, Paul M.; and Riccitiello, Salvatore R., 4,088,806, Cl. 428-332.000.
Richard, Gerard Yves: *See—*
Bhattacharyya, Asita; Dormoy, Michel Jean-Claude; and Richard, Gerard Yves, 4,088,624, Cl. 260-38.000.
Richardson Company, The: *See—*
Skalla, Dale; Meisenhelder, William C.; and Alsberg, Henry, 4,088,617, Cl. 260-23.0ST.
Richardson-Merrell Inc.: *See—*
Benson, Harvey D.; and Blohm, Thomas R., 4,088,760, Cl. 424-242.000.
Ricoh Co., Ltd.: *See—*
Noguchi, Koichi, 4,088,092, Cl. 118-7.000.
Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, 4,088,484, Cl. 96-1.50R.
Riebel, Hans-Jochem: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; and Hammann, Ingeborg, 4,088,758, Cl. 424-212.000.
Riew, Changkiu Keith, to B. F. Goodrich Company, The. Thermoplastic, thermosetting elastomeric compositions and methods for making the same. 4,088,708, Cl. 260-836.000.
Riken Keiki Fine Instrument Co., Ltd.: *See—*
Saito, Mitsuru; Nakamura, Toshihide; and Ogura, Shinichi, 4,088,985, Cl. 340-237.00R.
Rink, Rolf: *See—*
Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, 4,088,853, Cl. 200-19.00R.
Rippstein, Eugen: *See—*
Weisigk, Gunther; Rippstein, Eugen; and Musterle, Eugen, 4,088,841, Cl. 179-18.0FG.
RNLI (Trading) Limited: *See—*
Brinton, Michael Brian Jervis, 4,088,090, Cl. 115-17.000.
Robb, Neil E.: *See—*
Dulin, Patrick J.; Gorman, Thomas G.; Robb, Neil E.; and Wickham, Robert G., 4,088,423, Cl. 416-210.00R.
Roberson, Cletis L., to Owens-Corning Fiberglas Corporation. Method and apparatus for applying size to glass strands. 4,088,468, Cl. 65-3.00R.
Robert, Andre, to Upjohn Company, The. Cytoprotective prostaglandins for use in radiation-induced human intestinal diseases. 4,088,784, Cl. 424-317.000.
Robert Bosch GmbH: *See—*
Adler, Karl-Heinz; Drews, Ulrich; Werner, Peter; Moller, Heinz; and Kammerer, Heinz, 4,088,927, Cl. 315-209.00T.
Borst, Wolfgang; and Ott, Karl, 4,088,106, Cl. 123-146.50D.
Brammer, Hartmut; Ehrmann, Karl; Issler, Jorg; Jaki, Friedrich; Kalippke, Harald; Magdefrau, Herbert; and Rink, Rolf, 4,088,853, Cl. 200-19.00R.
Mitschke, Manfred; and Wallentowitz, Henning, 4,088,939, Cl. 318-576.000.
Roll, Karl; Hettich, Alfred; Stahl, Hubert; and Keil, Werner, 4,088,197, Cl. 173-12.000.
Steinke, Leo; and Tosch, Josef, 4,087,904, Cl. 29-611.000.
Wilhelm, Rudolf; and Heitmann, Jurgen, 4,089,026, Cl. 358-10.000.
Robertson, Donald Edwin, to IMC Chemical Group, Inc. Synthesis of dideoxyzearalane and related compounds. 4,088,658, Cl. 260-343.410.
Robinson, Frank; Girt, Keith Harry; and Whatmough, Nigel Stephen, to Courtaulds Limited. Fashioned garment including body panels containing wales running horizontally and inclined to a finished edge. 4,087,991, Cl. 66-189.000.
Rockland, Ronald H.; and Jirak, Thomas L., to Medtronic, Inc. Demand anti-arrhythmia pacemaker. 4,088,140, Cl. 128-419.0PG.
Rockwell International Corporation: *See—*
Elkins, Perry E.; Jones, A. Brooke; and Reekstin, John P., Jr., 4,088,896, Cl. 250-505.000.
Gillentine, Donald O., 4,087,885, Cl. 16-146.000.
Hooker, Marvin L., Jr., 4,088,996, Cl. 343-5.0VQ.
Jellies, David A., 4,088,863, Cl. 219-10.55E.
Perkins, William C., 4,088,957, Cl. 325-320.000.
Sholes, Leonard D., 4,088,031, Cl. 74-5.430.
Taylor, Billy E., 4,087,907, Cl. 29-721.000.
Rockwood, Stephen D., to United States of America, Energy. Method for separating boron isotopes. 4,088,553, Cl. 204-157.10R.
Roda, Cesare: *See—*
Montagroni, Nevio; and Roda, Cesare, 4,088,070, Cl. 100-121.000.
Rodriguez, Ernesto. Tennis ball device. 4,088,251, Cl. 224-5.00D.
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA); and Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Ion-exchanging aluminum silicate with hydrophilic surfaces. 4,088,593, Cl. 252-89.00R.
Roeder, George K. O-Ring seal assembly for borehole pump assembly. 4,088,328, Cl. 277-12.000.
Rogers, Alastair Stanley; and Thurlow, Norman Thorogood, to Post Office, The. Electronic current feed circuit. 4,088,843, Cl. 179-70.000.
Rogers, Howard G.: *See—*
Bloom, Stanley M.; and Rogers, Howard G., 4,088,487, Cl. 96-29.00D.
Rogora, Edoardo: *See—*
Bossi, Gianfranco; and Rogora, Edoardo, 4,088,096, Cl. 123-32.0EE.

Rohm and Haas Company: *See*—
Emmons, William D.; and Levy, Jerome F., 4,088,674, Cl. 560-154.000.
Rohr Industries, Inc.: *See*—
Atkinson, Thomas Carl; and Fay, Clifford C., 4,088,367, Cl. 297-457.000.
Roll, Karl; Hettich, Alfred; Stahl, Hubert; and Keil, Werner, to Robert Bosch GmbH. Power tool. 4,088,197, Cl. 173-12.000.
Rollmann, Louis D., to Mobil Oil Corporation. ZSM-5 containing aluminum-free shells on its surface. 4,088,605, Cl. 252-455.00Z.
Rolls, James P., to Upjohn Company, The. Δ^1 Dehydrogenation of corticoids without side chain degradation by Septomyxa. 4,088,537, Cl. 195-51.00E.
Roncillat, Michel: *See*—
Assouline, Georges; Hareng, Michel; Roncillat, Michel; and Leiba, Eugene, 4,088,400, Cl. 353-20.000.
Roofing Equipment, Inc.: *See*—
Prater, Earle F., 4,088,369, Cl. 299-37.000.
Roos, Ernst; Langner, Gunter; Kempermann, Theo; and Redetzky, Wolfgang, to Bayer Aktiengesellschaft. Cyclic acetals of polyols, their production and their use as non-discoloring anti-ozonants. 4,088,630, Cl. 260-45.80A.
Roos, Ernst: *See*—
Uhrhan, Paul; Lantzsch, Reinhard; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,088,629, Cl. 260-45.80N.
Roper Corporation: *See*—
Austin, Buddy Julian, 4,088,862, Cl. 219-10.55B.
Rose, Edgar; and Wlezien, Richard A., to Outboard Marine Corporation. Cross-scavenged, two-cycle internal combustion engine. 4,088,098, Cl. 123-73.00A.
Rosemount Inc.: *See*—
Geronime, Robert L., 4,089,036, Cl. 361-283.000.
Rosemund, Walter Richard: *See*—
Sandner, Michael Ray; Rosemund, Walter Richard; and Carey, Ronald David, 4,088,615, Cl. 260-2.5AM.
Rosen, Perry: *See*—
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,088,645, Cl. 544-232.000.
Rosenberger, Michael, to Hoffmann-La Roche Inc. Cyclohexenone phosphonium salts. 4,088,689, Cl. 260-586.00R.
Rosenthal, Janice Susannah; and Sapkus, Jurgis, to Mattel, Inc. Toy escalator. 4,087,932, Cl. 46-40.000.
Ross-Myring, Brian. 360° Cable actuating lever. 4,088,040, Cl. 74-501.00R.
Ross, William James: *See*—
Evans, Delme; Jolley, Michael Ralph John; Ross, William James; and Swann, Brian Picton, 4,088,773, Cl. 424-274.000.
Rossi, Albert; and Fernandez, William J., to Exxon Research & Engineering Co. Dual pour depressant combination for viscosity index improved waxy multigrade lubricants. 4,088,589, Cl. 252-56.00R.
Rossi, Nicholas V., to Rossi, Nicholas V.; Sclafani, Pasquale; Rossi, Orlando N.; Rossi, Victor H.; and Rossi, Richard P. Inflatable signal device. 4,088,162, Cl. 141-353.000.
Rossi, Orlando N.: *See*—
Rossi, Nicholas V., 4,088,162, Cl. 141-353.000.
Rossi, Richard P.: *See*—
Rossi, Nicholas V., 4,088,162, Cl. 141-353.000.
Rossi, Victor H.: *See*—
Rossi, Nicholas V., 4,088,162, Cl. 141-353.000.
Rossignol de la Ronde, Raymond Rene; and Castek, Charles Henri, to La Brosse et Dupont. Artists brushes. 4,088,413, Cl. 401-282.000.
Roszkowski, Adolph P.; Beard, Colin C.; Dvorak, Charles; and Weinhardt, Klaus, to Syntex (U.S.A.) Inc. 1-Lower alkyl-4,5-dihydro-5-phenyl-2-lower alkoxy carbonylaminoimidazoles and substituted phenyl derivatives thereof. 4,088,771, Cl. 424-273.00R.
Roth, Jeanne. Macrame frame. 4,088,351, Cl. 289-18.000.
Rothe, Werner: *See*—
Woog, Heinrich; Gruber, Werner; and Rothe, Werner, 4,088,759, Cl. 424-240.000.
Rothwell, Eric: *See*—
Smalley, Graham; Frost, David A.; and Rothwell, Eric, 4,088,584, Cl. 252-8.55D.
Rotter, Philippe: *See*—
Michelson, Adolf Michael; and Rotter, Philippe, 4,088,595, Cl. 252-95.000.
Rovac Corporation, The: *See*—
Edwards, Thomas C., 4,088,426, Cl. 418-8.000.
Rowney, Michael J., to LaSalle Steel Company. Steels combining toughness and machinability. 4,088,511, Cl. 148-12.00F.
Rozhkov, Leonid Georgievich: *See*—
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.
Rubin, Leon J.: *See*—
Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., 4,088,793, Cl. 426-266.000.
Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, to Siemens Aktiengesellschaft. Method for the preparation of relief structures. 4,088,489, Cl. 96-35.100.
Rudd, Robert W.; and Holodnak, Richard S., to Pitney-Bowes, Inc. Photocopying apparatus with magnetic brush developer and sheet guide. 4,088,402, Cl. 355-3.0DD.
Rudolph, Hans: *See*—
Elam, James O.; and Rudolph, Hans, 4,088,131, Cl. 128-145.700.
Ruger, Walther, to Refeka Werbemittel GmbH. Jalousie structure. 4,087,929, Cl. 40-488.000.
Ruhl, Heinz; and Gilbert, Jean, to GEA Kuhturmbau und Systemtechnik Gesellschaft mit Beschrankter Haftung. Cooling tower. 4,088,717, Cl. 261-109.000.
Ruka, Roswell J., to Westinghouse Electric Corp. Technique for protecting sensing electrodes in sulfiding environments. 4,088,543, Cl. 204-1.00T.
Rullman, Robert G.: *See*—
Diack, Archibald W.; Welborn, Warren S.; and Rullman, Robert G., 4,088,138, Cl. 128-419.00D.
Rupprecht, Kurt, to Volkswagenwerk Aktiengesellschaft. Tension spring arrangement. 4,088,311, Cl. 267-74.000.
Russev, Sheko Kolev: *See*—
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.
Ruth, Ralph G.: *See*—
Reed, Robert L.; Palm, John W.; and Ruth, Ralph G., 4,088,744, Cl. 423-573.00G.
Ryhman, Jens Olov; and Vogt, Nils Anton, to Billeruds Aktiebolag. Method of resin seasoning wood chips. 4,088,529, Cl. 162-65.000.
S.A.E.S. Getters S.p.A.: *See*—
Giorgi, Tiziano A.; and della Porta, Paolo, 4,088,456, Cl. 55-179.000.
S.I.A.D. Societa Italiana Acetilene E Derivati: *See*—
Bigi, Emanuele, 4,088,464, Cl. 62-22.000.
Sachar, Kenneth Selig, to International Business Machines Corporation. Visual display by electric control of scattering of light from a beam guided by an elastomer film. 4,088,991, Cl. 340-324.00M.
Sack GmbH: *See*—
Zurmahr, Horst, 4,088,309, Cl. 266-130.000.
Sadan, Abraham. Concentration of underground brines in situ by solar evaporation. 4,088,451, Cl. 23-295.00S.
Saffold, Robert. Rack for bicycles. 4,088,253, Cl. 224-42.03B.
Safir, Sidney Robert: *See*—
Fanshawe, William Joseph; Epstein, Joseph William; Crawley, Lantz Stephen; Hofmann, Corris Mabelle; and Safir, Sidney Robert, 4,088,652, Cl. 260-293.540.
Sagan, Vitaly Ivanovich: *See*—
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.
Sagebiel, Dan. Trailer hitch assembly for pickup truck. 4,088,339, Cl. 280-423.00R.
Saint-Gobain Industries: *See*—
Mercier, Alain; and Fournier, Yves, 4,088,522, Cl. 156-107.000.
St. Pierre, Raymond Marie: *See*—
Edmisson, Russell Curtis; May, Herbert; and St. Pierre, Raymond Marie, 4,087,935, Cl. 46-202.000.
St. Regis Paper Company: *See*—
Vogt, Russell C., 4,088,264, Cl. 229-55.000.
Saito, Mitsuru; Nakamura, Toshihide; and Ogura, Shinichi, to Sumitomo Chemical Company, Limited; and Riken Keiki Fine Instrument Co., Ltd. Centralized monitoring system for gas leakage. 4,088,985, Cl. 340-237.00R.
Sakaki, Yoshihiro; Mitomo, Takeshi; and Nakagaki, Akitsuna, to Nissan Motor Company, Ltd.; and Kabushiki Kaisha Tsuchiya Seisakusho. Disc type matrix of rotary regenerative heat exchanger. 4,088,181, Cl. 165-8.000.
Sakamaki, Hisashi: *See*—
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,088,872, Cl. 235-91.00R.
Sakamoto, Takeshi: *See*—
Anzai, Shunichi; Uenishi, Akira; and Sakamoto, Takeshi, 4,088,183, Cl. 165-104.00S.
Sakata, Nobuhiro; and Suzuki, Toshihiro, to Nippon Sheet Glass Co., Ltd.; and Nippon Pelnox Corporation. Shaped articles of cellulosic plastics having abrasion-resistant coating. 4,088,807, Cl. 428-334.000.
Sakazaki, Tadashi: *See*—
Nakazawa, Kichi; Okamoto, Masafumi; Tanaka, Kiyoshi; and Sakazaki, Tadashi, 4,088,513, Cl. 148-112.000.
Sakurada, Nobuaki: *See*—
Ito, Tadashi; Sakurada, Nobuaki; Kawamura, Masaharu; Shinoda, Nobuhiko; Ito, Fumio; and Murakami, Hiroyashu, 4,089,010, Cl. 354-23.00D.
Sakurai, Hiroshi, to Epoch Company, Ltd. Circuitry for controlling location of a racket in a television game apparatus. 4,088,321, Cl. 273-85.00G.
Sakurai, Terushige: *See*—
Tomioka, Kunio; Kita, Masaaki; and Sakurai, Terushige, 4,088,000, Cl. 72-342.000.
Salem Corporation: *See*—
Wilt, Charles R., Jr.; and Schauermann, Floyd L., 4,087,923, Cl. 34-32.000.
Salter, Larry, to Briles, Paul R., a part interest. Sleeve bolt installation nut. 4,087,896, Cl. 29-256.000.
Saltzman, Ronald; Ferrara, William J.; and Wasilewski, Olgierd, to Sun

Chemical Corporation. Rosin-modified epoxy resins. 4,088,618, Cl. 260-24.000.

Salvador, Rene: *See—*
Knoblauch, Wolfgang; Mucke, Rainer; and Salvador, Rene, 4,088,590, Cl. 252-73.000.

Samis, Michael A. Non-equilibrium plasma glow jet. 4,088,966, Cl. 313-231.500.

Sanders Associates, Inc.: *See—*
Hayner, Paul F., 4,088,059, Cl. 89-43.00A.

Sanderson, Ian Peter: *See—*
Johnson, Archibald Horace; and Sanderson, Ian Peter, 4,088,431, Cl. 425-198.000.

Sandmeier, Willi; and Uebelhart, Willi, to Sulzer Brothers Ltd. Holding device for small parts to be electroplated. 4,088,559, Cl. 204-297.00W.

Sandner, Michael Ray; Rosemund, Walter Richard; and Carey, Ronald David, to Union Carbide Corporation. Method of improving the diecuttability of polyester urethane foam and the improved diecuttable polyester urethane foams themselves. 4,088,615, Cl. 260-2.5AM.

Sando Iron Works Co., Ltd.: *See—*
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,087,992, Cl. 68-5.00E.
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,087,993, Cl. 68-18.00R.

Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co., Ltd. Pressure sealing device for high pressure steamer. 4,087,992, Cl. 68-5.00E.

Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co., Ltd. Heat fulling and water washing apparatus. 4,087,993, Cl. 68-18.00R.

Sandoz, Inc.: *See—*
Michaelis, Arthur F., 4,088,798, Cl. 427-3.000.

Sandoz Ltd.: *See—*
Baserga, Emilio, 4,088,661, Cl. 260-378.000.

Sands, John L.: *See—*
Paget, Charles J.; and Sands, John L., 4,088,768, Cl. 424-270.000.

Sankewitsch, Vladimir: *See—*
Desjardins, Rene A.; Ellis, Charles W.; and Sankewitsch, Vladimir, 4,088,042, Cl. 74-574.000.

San Miguel, Anthony, to United States of America, Navy. Fuel tank leakage fiber flow sealant. 4,088,240, Cl. 220-452.000.

Sansone, Frank Peter: *See—*
Lee, James Patrick, Jr.; Raffa, Joseph Anthony; Sansone, Frank Peter; and Stochel, Nathan Harold, 4,089,051, Cl. 364-200.000.

Santi, Rinaldo: *See—*
Pellegri, Alberto; and Santi, Rinaldo, 4,088,556, Cl. 204-222.000.

Santini, Umberto: *See—*
Radici, Pierino; Erini, Pietro; Santini, Umberto; and Colombo, Paolo, 4,088,818, Cl. 544-186.000.

Sanyo Electric Co., Ltd.: *See—*
Sumi, Yasuaki, 4,088,959, Cl. 325-459.000.

Sapkus, Jurgis: *See—*
Rosenthal, Janice Susannah; and Sapkus, Jurgis, 4,087,932, Cl. 46-40.000.

Sapunarov, Ivan Mitrev: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.

Sargent Industries, Inc.: *See—*
Smith, Fred T., 4,088,234, Cl. 214-83.300.

Sarian, Suren, to Reluxtrol Company, The. Eddy-current test probe utilizing a combination of high and low reluctance materials to optimize probe sensitivity. 4,088,953, Cl. 324-232.000.

Sasaki, Masaomi: *See—*
Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, 4,088,484, Cl. 96-1.50R.

Sasaki, Takashi: *See—*
Habu, Teiji; Korematsu, Shinobu; Wada, Tsuneo; Omura, Takayosi; Ishii, Hiroki; and Sasaki, Takashi, 4,088,495, Cl. 96-111.000.

Sass, Donald J. Time of day, time and date and event number generator for recordation of physiological events. 4,088,990, Cl. 340-324.00R.

Sasser, Bill H.: *See—*
Immell, Raymond G.; and Sasser, Bill H., 4,089,005, Cl. 343-845.000.

Sata, Takeo; Takamura, Masayuki; Shinoda, Norio; and Hatae, Masataka, to Nippon Gakki Seizo Kabushiki Kaisha. Process for producing a heat pipe. 4,087,893, Cl. 29-157.30A.

Sato, Naonobu; and Shinnou, Kaoru, to Hitachi, Ltd. Semiconductor device capable of withstanding high voltage and method of manufacturing same. 4,089,021, Cl. 357-20.000.

Saucy, Gabriel: *See—*
Chan, Ka-Kong; and Saucy, Gabriel, 4,088,662, Cl. 260-404.000.

Saunders, Howard E.: *See—*
Elbling, Irving N.; and Saunders, Howard E., 4,088,809, Cl. 428-379.000.

Saunders, Richard J.: *See—*
Theeuwes, Felix; Saunders, Richard J.; and Mefford, Wayne S., 4,088,864, Cl. 219-121.0LM.

Savins, Joseph George; and Anderson, Maynard L., to Mobil Oil Corporation. Process for production of alga biopolymer and biomass. 4,087,936, Cl. 47-1.400.

Sawko, Paul M.; and Riccitiello, Salvatore R., to United States of America, National Aeronautics and Space Administration. Intumescent-ablator coatings using endothermic fillers. 4,088,806, Cl. 428-332.000.

Scaletta, Joseph A.: *See—*
Miller, Roland E.; Scaletta, Joseph A.; and Valek, John, 4,088,086, Cl. 113-30.000.

Schaefer, Donald J. Insulating container carrier and adaptor. 4,088,250, Cl. 224-5.00W.

Schaefer, William L., to PPG Industries, Inc. Environmental control of a glass fiber forming bushing. 4,088,469, Cl. 65-5.000.

Schafer, Walter: *See—*
Findeisen, Kurt; Wagner, Kuno; Schafer, Walter; and Hennig, Hans Joachim, 4,088,665, Cl. 260-453.0AM.

Schaffer, Joseph Francis: *See—*
Chan, Lock-Lim; and Schaffer, Joseph Francis, 4,088,530, Cl. 162-168.0NA.

Schasser, Donald S., to Automatic Parking Devices, Inc. Static card reader having multiple selectable codes. 4,088,878, Cl. 235-436.000.

Schauermann, Floyd L.: *See—*
Wilt, Charles R., Jr.; and Schauermann, Floyd L., 4,087,923, Cl. 34-32.000.

Scheffel, Gary W., to Weatherhead Company, The. Brake booster with spring type ratio changer. 4,087,972, Cl. 60-548.000.

Schell, Frederick S.: *See—*
Shane, Hugh J. S.; and Schell, Frederick S., 4,088,601, Cl. 252-358.000.

Schellenberg, Walter, to Max Sandherr AG. Thin metal foil membrane can closure having an easy-open scoreline. 4,088,242, Cl. 220-258.000.

Schemmel, Robert Archer. Device for self-defense training. 4,088,315, Cl. 272-76.000.

Schering Aktiengesellschaft: *See—*
Berwald, Ernst; and Asbeck, Volker, 4,088,238, Cl. 220-1.500.
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,088,775, Cl. 424-278.000.

Schering-Corporation: *See—*
Gold, Elijah H., 4,088,644, Cl. 260-239.00A.

Schering, Stig, to SMT Machine Company AB. Turret toolposter. 4,087,891, Cl. 29-36.000.

Schirmer, Robert M., to Phillips Petroleum Company. Combustor for low-level NO_x and CO emissions. 4,087,963, Cl. 60-39.230.

Schlatter, Gerald Lance: *See—*
Resler, Glen Leroy; and Schlatter, Gerald Lance, 4,088,987, Cl. 340-242.000.

Schlick, Horst, to VDO Adolf Schindling AG. Electrically heated windshield washer spray nozzle assembly. 4,088,269, Cl. 239-133.000.

Schluep, Rene; and Koch, Josef, to Storen- und Maschinenfabrik Emil Schenker AG. Venetian blind. 4,088,171, Cl. 160-170.000.

Schmerling, Louis, to UOP Inc. Transesterification of olefins. 4,088,820, Cl. 560-103.000.

Schmid, Hans: *See—*
Muhlemann, Hans Rudolf; and Schmid, Hans, 4,088,752, Cl. 424-57.000.

Schmid, Markus; and Fuchs, Adolf, to Concast AG. Apparatus for measuring the geometry of the hollow mold compartment of continuous casting molds. 4,087,918, Cl. 33-174.00P.

Schmidlin, Fred William: *See—*
Ing, Samuel Wei; and Schmidlin, Fred William, 4,088,485, Cl. 96-1.50R.

Schmidt, Robert H., to Electro-Craft Corporation. Brushless DC tachometer circuit. 4,088,943, Cl. 322-90.000.

Schneider, Marvin L.: *See—*
Johnson, Lowell E.; Ireland, Gerald B.; and Schneider, Marvin L., 4,088,043, Cl. 74-681.000.

Schneider, Michel, to Battelle Memorial Institute. Reversibly precipitable immobilized enzyme complex and a method for its use. 4,088,538, Cl. 195-63.000.

Schneider, Thomas E.: *See—*
Fusco, Vito A.; Bennett, Joseph C.; Funcik, Jack F.; Kufner, Kenneth L.; and Schneider, Thomas E., 4,087,908, Cl. 29-753.000.

Schoeffel, Dietmar M.; and Sonnenschein, Armin K., to Schoeffel Instrument Corp. High pressure fluorescence flow-through cuvette. 4,088,407, Cl. 356-85.000.

Schoeffel Instrument Corp.: *See—*
Schoeffel, Dietmar M.; and Sonnenschein, Armin K., 4,088,407, Cl. 356-85.000.

Scholefield, Edward Harold, to Airmatic/Beckett-Harcum, Inc. Method of making an end connection to a fluid power cylinder and product. 4,087,897, Cl. 29-509.000.

Scholtholt, Josef: *See—*
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,088,764, Cl. 424-251.000.

Schouteeten, Alain: *See—*
Christidis, Yani; and Schouteeten, Alain, 4,088,657, Cl. 260-332.20A.

Schoutteten, Christian: *See—*
Chevalier, Claude; Le Diouron, Raymond; Schoutteten, Christian; Le Floch, Daniel; and Le Bot, Jean-Pierre, 4,087,899, Cl. 29-527.600.

Schraven, Eckhard: *See—*
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,088,764, Cl. 424-251.000.

Schreiber, William L.; and Pittet, Alan O., to International Flavors & Fragrances Inc. Processes for producing alkenals and intermediates therefor. 4,088,696, Cl. 260-601.00R.

Schreiner, Lester Dale; and Steilen, Ronald Michael, to Deere & Company. Foldable implement. 4,088,346, Cl. 280-656.000.

Schrock, Maurice D.; and Spector, George. Finger hole knife. 4,087,911, Cl. 30-286.000.

Schroder, Rolf: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; and Hammann, Ingeborg, 4,088,758, Cl. 424-212.000.

Schroeder, Charles H. Head orienting device for cephalometric X-rays. 4,088,893, Cl. 250-451.000.

Schroeter, Siegfried H.: *See—*
Bolon, Donald A.; Lucas, Gary M.; and Schroeter, Siegfried H., 4,088,801, Cl. 427-54.000.

Schuck, Wolf Dieter: *See—*
Hermann, Walter; Kuehl, Burkhart; and Schuck, Wolf Dieter, 4,088,971, Cl. 333-84.00R.

Schuler, Thomas C.: *See—*
Murty, Vabilisetti S.; and Schuler, Thomas C., 4,088,582, Cl. 210-516.000.

Schulze, Ernst-Friedrich: *See—*
Matterstock, Karl; Langeluddeke, Peter; and Schulze, Ernst-Friedrich, 4,088,474, Cl. 71-108.000.

Schumacher, Frank A.; and Sterling, John E., to General Electric Company. Defrost pressure control system. 4,087,987, Cl. 62-276.000.

Schumacher, Heinz. Method of and device for spontaneously distilling off secondary substances especially from oily liquids. 4,088,542, Cl. 203-88.000.

Schumacher, Ignatius: *See—*
Stoffel, Paul J.; and Schumacher, Ignatius, 4,088,472, Cl. 71-92.000.

Schurger, Joseph Anthony, to Borg-Warner Corporation. Cylinder locking apparatus. 4,088,151, Cl. 137-596.200.

Schwab, Manfred, to Fa. Alfred Hansel, Nieten- und Metallwarenfabrik. Blind riveter. 4,088,003, Cl. 72-391.000.

Schwalbe, Ingemar. Clothes stand. 4,088,228, Cl. 211-4.000.

Schwartz, Albert B., to Mobil Oil Corporation. Catalytic cracking of hydrocarbons. 4,088,568, Cl. 208-121.000.

Schwartz, Lawrence B., to Acricite Company, Inc. Handbag with detachable handles. 4,088,167, Cl. 150-33.000.

Scimeca, Frederick J.: *See—*
Kim, Han J.; Reid, F. Joseph; and Scimeca, Frederick J., 4,088,480, Cl. 75-200.000.

Sclafani, Pasquale: *See—*
Rossi, Nicholas V., 4,088,162, Cl. 141-353.000.

Scott Paper Company: *See—*
Plumadore, John D., 4,088,892, Cl. 250-325.000.

Seiderman, Abe. Lateral extension bowl attachment device for adapting standard relatively hinged toilet seat and cover assemblies for use with non-standard bowls. 4,087,884, Cl. 16-129.000.

Seifert, Hermann: *See—*
Prescher, Gunter; Weiberg, Otto; Waldmann, Helmut; and Seifert, Hermann, 4,088,679, Cl. 260-502.00R.

Seiz, Carl Gary: *See—*
Jacoby, Peter H.; Seiz, Carl Gary; and Egner, Robert J., 4,088,229, Cl. 211-191.000.

Seiz Corporation: *See—*
Jacoby, Peter H.; Seiz, Carl Gary; and Egner, Robert J., 4,088,229, Cl. 211-191.000.

Serebrennikov, Vladimir Nikolaevich: *See—*
Demin, Alexandr Viktorovich; Balezin, Igor Nikolaevich; Kosinsky, Konstantin Alexeevich; Serebrennikov, Vladimir Nikolaevich; Popov, Vadim Likarionovich; Shipkov, Nikolai Nikolaevich; and Dovguchits, Eduard Fedorovich, 4,088,503, Cl. 106-56.000.

Seree de Roch, Irenee: *See—*
Gadelle, Claude; Laloz, Jean-Pierre; and Seree de Roch, Irenee, 4,088,734, Cl. 423-210.000.

Serex, Charles: *See—*
Hugelin, Bernard; Blanc, Claude-Alain; and Serex, Charles, 4,088,442, Cl. 8-2.50A.

Sermon, Paul Anthony, to Johnson, Matthey & co., Limited. Catalyst for the decomposition of nitrogen oxides. 4,088,604, Cl. 252-455.00R.

Serratto, Angelo. Valve for the automatic flow control of a fluid in a conditioning system. 4,088,150, Cl. 137-499.000.

Severinsson, Lars Magnus, to H R B Tooling AB. Method of producing forming tools. 4,088,046, Cl. 76-107.00R.

Seymour, Robert W.; Weaver, James C.; and Gray, Theodore F., Jr., to Eastman Kodak Company. Phosphorus stabilized-polyester-polycarbonate molding compositions. 4,088,709, Cl. 260-860.000.

Sgourakes, George E.; and McCullough, Robert C., to Foxboro Company, The. Vortex flowmeter apparatus. 4,088,020, Cl. 73-194.0VS.

Shane, Hugh J. S.; and Schell, Frederick S., to Hart Chemical Limited. Water-emulsifiable defoamer composition. 4,088,601, Cl. 252-358.000.

Shannon, Roger L.: *See—*
United States of America, National Aeronautics and Space Administration; Shannon, Roger L.; and Gillette, Roger B., 4,088,926, Cl. 315-111.200.

Sharki, Martin James: *See—*
Phillips, Victor Quin; Griffin, Phil Harmon; and Sharki, Martin James, 4,088,457, Cl. 55-194.000.

Sharp Kabushiki Kaisha: *See—*
Naemura, Akio, 4,087,909, Cl. 30-43.600.

Sheerer, Marley. Positively positionable ruler. 4,087,917, Cl. 33-107.00R.

Sheffield, William F.: *See—*
Taylor, Allen L.; and Sheffield, William F., 4,089,034, Cl. 361-233.000.

Shell Oil Company: *See—*
Fernley, George W.; and Daane nee Pluim, Gerdina J. R., 4,088,594, Cl. 252-89.00R.
Gergen, William P.; and Davison, Sol, 4,088,626, Cl. 260-42.180.
Gergen, William P.; and Davison, Sol, 4,088,627, Cl. 260-42.180.
Gergen, William P.; and Davison, Sol, 4,088,711, Cl. 260-873.000.

Shelton, Robert Wayne: *See—*
Hunsucker, Jerry Hoyt; and Shelton, Robert Wayne, 4,088,817, Cl. 544-162.000.

Shemtov, Sami, to Gould Inc. Universally angularly adjustable pipe coupling. 4,088,348, Cl. 285-184.000.

Sheppard, Chester Stephen; MacLeay, Ronald Edward; and Bafford, Richard Anthony, to Pennwalt Corporation. Compounds having both peroxy and aliphatic azo groups. 4,088,642, Cl. 260-174.000.

Sheppard, Richard H. Power steering gear with short piston and fluid bearings. 4,088,063, Cl. 91-378.000.

Sherman, William F. Method of bonding a phenol-based thermoplastic resin to a cured and molded thermoset phenolic plastic. 4,088,729, Cl. 264-259.000.

Sherwood Medical Industries Inc.: *See—*
Murty, Vabilisetti S.; and Schuler, Thomas C., 4,088,582, Cl. 210-516.000.

Shevtsov, Viktor Lvovich: *See—*
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.

Shibahara, Tetsuya: *See—*
Shigematsu, Taichiro; Shibahara, Tetsuya; Nakazawa, Makoto; Tomida, Masayuki; and Munakata, Toshio, 4,088,767, Cl. 424-269.000.

Shibamoto, Nobuyori: *See—*
Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, 4,088,702, Cl. 568-747.000.

Shibatani, Juichi: *See—*
Ishikawa, Masakazu; Shibatani, Juichi; Oka, Hiroyuki; Mitsuoka, Naomi; and Matsuda, Mitsuo, 4,088,001, Cl. 72-370.000.

Shidara, Naohiro: *See—*
Yabuki, Takashi; Shidara, Naohiro; and Kimura, Tomoaki, 4,088,179, Cl. 164-441.000.

Shigematsu, Taichiro; Shibahara, Tetsuya; Nakazawa, Makoto; Tomida, Masayuki; and Munakata, Toshio, to Mitsubishi Chemical Industries Limited. 4-Dichlorophenylurazole compounds and use in agricultural fungicidal compositions. 4,088,767, Cl. 424-269.000.

Shigematsu, Tomohisa: *See—*
Suzuki, Yasoji; Shigematsu, Tomohisa; Kokado, Nawoyuki; and Kudo, Yukinori, 4,088,958, Cl. 325-396.000.

Shimomura, Jun, to Nippon Kogaku K.K. Electro-optical light control element. 4,088,394, Cl. 350-356.000.

Shindo, Takemasa; Ito, Yoshikazu; and Arai, Kenichiro, to Shinshu Seiki Kabushiki Kaisha; and Kabushiki Kaisha Suwa Seikosha. Thermally sensitive printer. 4,088,214, Cl. 400-120.000.

Shinnou, Kaoru: *See—*
Sato, Naonobu; and Shinnou, Kaoru, 4,089,021, Cl. 357-20.000.

Shinoda, Nobuhiko: *See—*
Ito, Tadashi; Sakurada, Nobuaki; Kawamura, Masaharu; Shinoda, Nobuhiko; Ito, Fumio; and Murakami, Hiroyashu, 4,089,010, Cl. 354-23.00D.

Shinoda, Norio: *See—*
Sata, Takeo; Takamura, Masayuki; Shinoda, Norio; and Hatae, Masataka, 4,087,893, Cl. 29-157.30A.

Shinshu Seiki Kabushiki Kaisha: *See—*
Shindo, Takemasa; Ito, Yoshikazu; and Arai, Kenichiro, 4,088,214, Cl. 400-120.000.

Shipkov, Nikolai Nikolaevich: *See—*
Demin, Alexandr Viktorovich; Balezin, Igor Nikolaevich; Kosinsky, Konstantin Alexeevich; Serebrennikov, Vladimir Nikolaevich; Popov, Vadim Likarionovich; Shipkov, Nikolai Nikolaevich; and Dovguchits, Eduard Fedorovich, 4,088,503, Cl. 106-56.000.

Shiraishi, Satoshi: *See—*
Nakahara, Tsuneo; Hoshikawa, Masao; Shiraishi, Satoshi; Kurosaki, Shiro; and Fujiwara, Kunio, 4,088,388, Cl. 350-96.300.

Shkolnik, Vladimir Emmanuilovich: *See—*
Prigorovsky, Igor Alexandrovich; Ignatiev, Anatoly Denisovich; Shkolnik, Vladimir Emmanuilovich; Khutoretsky, Garri Mikhailovich; Vorontsov, Alexandr Ivanovich; and Fridman, Vladimir Markovich, 4,088,913, Cl. 310-260.000.

Sholes, Leonard D., to Rockwell International Corporation. Air erected gyro. 4,088,031, Cl. 74-5.430.

Shono, Hiroaki; Wakasa, Isao; Kikuchi, Toshiaki; and Noji, Toshio, to Nitto Boseki Co., Ltd. Process for spinning glass fibers. 4,088,467, Cl. 65-2.000.

Shriver, Lloyd L., Jr., to Westinghouse Electric Corp. Process for coating envelope for reflector-type fluorescent lamp and the lamp resulting therefrom. 4,088,802, Cl. 427-67.000.

Shtanko, Jury Pavlovich: *See—*
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.

Shumway, Durland K.: *See—*
Kenkare, Divaker B.; Gray, Frederick W.; and Shumway, Durland K., 4,088,751, Cl. 424-47.000.

Shupe, Russell D., to Texaco Inc. Surfactant oil recovery process usable in high temperature formations containing high salinity water. 4,088,189, Cl. 166-272.000.

Shure, Lloyd I.: *See—*
Beremand, Donald G.; Shure, Lloyd I.; and Mroz, Thaddeus S., 4,087,962, Cl. 60-39.650.

SI Handling Systems, Inc.: *See—*
Brown, William L., 4,088,237, Cl. 214-152.000.

Siby, Sture: *See—*
Dahle, Orvar; Von Knorring, Folke; Nordvall, Jan; and Siby, Sture, 4,088,013, Cl. 73-141.00A.

Siegel, Allen E.: *See—*
Bhat, Vasanth K.; Siegel, Allen E.; Vogel, Richard E.; and Burrows, Larry G., 4,088,105, Cl. 123-145.00A.

Siegel, Merrell: *See—*
Whitesides, George M.; Garrett, Patricia E.; and Siegel, Merrell, 4,088,675, Cl. 260-501.210.

Siegemund, Gunter; and Muschaweck, Roman, to Hoechst Aktiengesellschaft. 1,2,2,2-Tetrafluoroethyl-fluoromethyl ether and process for preparing it. 4,088,701, Cl. 260-614.00F.

Siegrist, Otto: *See—*
Leimbacher, Erwin; Siegrist, Otto; and Steiger, Alfred, 4,088,440, Cl. 8-2.50A.

Siekanowicz, Wieslaw Wojciech; Anderson, Charles Hammond; and Credelle, Thomas Lloyd, to RCA Corporation. Flat display device with beam guide. 4,088,920, Cl. 313-422.000.

Siekmann, Gerd: *See—*
Hofen, Willi; Prescher, Gunter; Siekmann, Gerd; and Wolf, Gunter, 4,088,676, Cl. 260-502.00R.

Siemens Aktiengesellschaft: *See—*
Gross, Franz, 4,088,924, Cl. 315-3.500.
Losehand, Reinhard, 4,089,023, Cl. 357-24.000.
Martin, Erwin; Hoffmann, Helmut; and Brunnert, Otto, 4,088,917, Cl. 310-357.000.
Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, 4,088,489, Cl. 96-35.100.
Weineck, Hans; and Maringer, Albert, 4,088,916, Cl. 310-338.000.
Wetzig, Dieter, 4,088,911, Cl. 310-178.000.

Siemens-Albis Aktiengesellchaft: *See—*
Weisigk, Gunther; Rippstein, Eugen; and Musterle, Eugen, 4,088,841, Cl. 179-18.0FG.

Sigg-Grutter, Trudi; and Wild, Jost, to Givaudan Corporation. Process for making humulones and novel intermediates therefor. 4,088,688, Cl. 260-586.00D.

Sih, Charles J., to Wisconsin Alumni Research Foundation. Method for preparing prostaglandins. 4,088,536, Cl. 195-30.000.

Sikora, Harald, to Maschinenbau Scholz GmbH & Co. KG. Process and apparatus for determining the position of an elongated object with respect to a reference axis. 4,088,952, Cl. 324-207.000.

Simmons, Gerald P.: *See—*
Helton, Eugene L.; and Simmons, Gerald P., 4,088,429, Cl. 425-8.000.

Simon, Heinrich: *See—*
Fabian, Peter; Jedlitschka, Ernst; Krebs, Helmut; and Simon, Heinrich, 4,088,558, Cl. 204-288.000.

Simons, Harold Martell, to Billings Energy Corporation. Method of making ferrotitanium alloy. 4,088,176, Cl. 164-66.000.

Simplimatic Engineering Co.: *See—*
Bowser, Robert E., 4,088,221, Cl. 198-491.000.

Simpson, Howard D., to Union Oil Company of California. Extrusion die. 4,088,433, Cl. 425-464.000.

Sinfelt, John H.: *See—*
Carter, James L.; and Sinfelt, John H., 4,088,603, Cl. 252-454.000.

Singer, Thomas C. Combination telephone and calculator with common keyboard having reversible indicia. 4,088,837, Cl. 179-2.0DP.

Sinsky, Allen I.: *See—*
Kerr, Leo A.; Sinsky, Allen I.; and Gonsalves, Richard, 4,089,002, Cl. 343-11.00R.

Sintani, Kaduwo: *See—*
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.

Sipirora, Joseph J.: *See—*
Engler, Clifford G.; and Sipirora, Joseph J., 4,088,944, Cl. 324-.5AH.

Six, Jean-Claude Gerard: *See—*
Coulmance, Jean-Pierre Rene; and Six, Jean-Claude Gerard, 4,088,871, Cl. 219-497.000.

Skalla, Dale; Meisenhelder, William C.; and Alsberg, Henry, to Richardson Company, The. Phonographic record molding composition. 4,088,617, Cl. 260-23.0ST.

Skipper, Bobby Ray: *See—*
Maynard, Robert Nelson; Skipper, Bobby Ray; and Millman, Nathan, 4,088,732, Cl. 423-122.000.

Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, to Schering Aktiengesellschaft. 15-Ethylenedioxy-prostanoic acid derivatives and esters thereof and intermediates thereof. 4,088,775, Cl. 424-278.000.

Sladkov, German Vladimirovich: *See—*
Gumen, Valery Fedorovich; Kalininskaya, Tatyana Vasilievna; Loparev, Robert Nikolaevich; and Sladkov, German Vladimirovich, 4,088,908, Cl. 310-49.00R.

Slater, Larry E.: *See—*
Huggett, George R.; and Slater, Larry E., 4,087,920, Cl. 33-367.000.

Slazas, John J.; and Gunther, Arno, to Allis-Chalmers Corporation. Hydrostatic transmission control. 4,087,970, Cl. 60-487.000.

Slovinsky, Manuel: *See—*
Matt, Joseph; and Slovinsky, Manuel, 4,088,678, Cl. 260-502.40R.

Smalley, Graham; Frost, David A.; and Rothwell, Eric, to Allied Colloids Limited. Secondary recovery of oil and polymers useful for this. 4,088,584, Cl. 252-8.55D.

Smirle, James M. Movable bed frame. 4,087,872, Cl. 5-63.000.

Smith, Alistair Y.; Dietrich, Paul; and Pickenhagen, Wilhelm, to Firmenich S.A. Process for preparing a diketo-piperazine. 4,088,649, Cl. 544-385.000.

Smith, Don H., to Tyler Holding Company. Hand-held detonator. 4,089,035, Cl. 361-251.000.

Smith, Francis Hughes, to Vickers Limited. Optical sizing instrument. 4,088,410, Cl. 356-163.000.

Smith, Fred, to Anglian Water Authority. Apparatus for forming silicate products. 4,088,449, Cl. 23-283.000.

Smith, Fred T., to Sargent Industries, Inc. Front end loader. 4,088,234, Cl. 214-83.300.

Smith, Irwin M., to Fichter, Frederick L. Filtration module. 4,088,463, Cl. 55-480.000.

Smith Kline & French Laboratories Limited: *See—*
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,088,769, Cl. 424-270.000.

Smith, Norman Alfred, to Ciba-Geigy AG. Bis 1,4-(b-vinylso$_2$-propionyl)-piperazine. 4,088,648, Cl. 544-387.000.

Smith, R. Lowell; Logan, J. Douglas; and Kendall, Michael P., to Horizons Research Incorporated. Electrostatic aperture printing. 4,088,891, Cl. 250-315.00R.

Smith, Ray E., to Velsicol Chemical Corporation. Durable flame retardant finishes for textile materials. 4,088,592, Cl. 252-8.100.

Smith, Raymond E., Jr. Adjustable scaffold. 4,088,203, Cl. 182-141.000.

Smith, Richard J. Fin assembly for power boats. 4,088,091, Cl. 115-39.000.

Smith, Richard O. Bottle crusher. 4,088,274, Cl. 241-99.000.

Smith, Robert W.: *See—*
Gowetski, Michael; and Smith, Robert W., 4,088,525, Cl. 156-173.000.

Smith, Terence: *See—*
Jarvis, William Joseph; and Smith, Terence, 4,088,370, Cl. 299-43.000.

SMT Machine Company AB: *See—*
Schering, Stig, 4,087,891, Cl. 29-36.000.

Snamprogetti, S.p.A.: *See—*
Zappelli, Piergiorgio; Re, Luciano; and Marconi, Walter, 4,088,639, Cl. 260-112.50R.

Societa Italiana Resine S.I.R. S.p.A.: *See—*
Radici, Pierino; Erini, Pietro; Santini, Umberto; and Colombo, Paolo, 4,088,818, Cl. 544-186.000.

Societa Italiana Vetro SIV S.p.A.: *See—*
Ciarniello, Giorgio; and De Lena, Oscar, 4,088,940, Cl. 322-8.000.

Societe anonyme des Fonderies et Ateliers L. Choquenet: *See—*
Carle, Jean-Claude Alfred, 4,088,581, Cl. 210-391.000.

S.A. Vandeputte Fils & Cie: *See—*
Bezsilko, Nicolas, 4,088,143, Cl. 133-1.00R.

Societe d'Applications de Procedes Industriels et Chimiques S.A.P.I.C.: *See—*
Bhattacharyya, Asita; Dormoy, Michel Jean-Claude; and Richard, Gerard Yves, 4,088,624, Cl. 260-38.000.

Societe d'Assistance Technique pour Produits Nestle SA (Nestec): *See—*
Bracco, Umberto, 4,088,792, Cl. 426-250.000.

Societe Dilumelt, The: *See—*
Huet, Joel, 4,089,050, Cl. 366-181.000.

Societe Hexachimie: *See—*
Teulon, Jean-Marie, 4,088,787, Cl. 424-343.000.

Societe Lannionnaise d'Electronique Sle-Citerel S.A.: *See—*
Lalanne, Alain; and Renaudin, Yves, 4,088,845, Cl. 179-18.0GE.

Societe Nationale des Poudres et Explosifs: *See—*
Kehren, Jean-Paul Andre; and Ousset, Robert Andre, 4,088,518, Cl. 149-11.000.

Societe Nationale Elf Aquitaine (Prod.): *See—*
Tozzolino, Pierre, 4,088,781, Cl. 424-303.000.

Societe Suisse pour l'Industrie Horlogere Management Services, S.A.: *See—*
Kuechli, Gottfried; and Volgyi, Paul, 4,087,894, Cl. 29-179.000.

Sogabe, Itsushi; and Souda, Kiyoshi, to Japan Aircraft Manufacturing Co., Inc. Motor-glider. 4,088,285, Cl. 244-16.000.

Solomon, Elias E., to Gulf & Western Manufacturing Company. Intrusion detection apparatus. 4,088,989, Cl. 340-274.00R.

Sonnenberg, Fred Max, to American Hoechst Corporation. Bibenzyl-4-sulfonyl chloride. 4,088,683, Cl. 260-543.00R.

Sonnenschein, Armin K.: *See—*
Schoeffel, Dietmar M.; and Sonnenschein, Armin K., 4,088,407, Cl. 356-85.000.

Sono, Masaki: *See—*
Yamamoto, Yoshio; Sono, Masaki; and Ekeuti, Masahiko, 4,088,828, Cl. 174-68.500.

Sony Corporation: *See—*
Muramoto, Shoichi; and Nishigaki, Susumu, 4,088,984, Cl. 340-228.00R.
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, 4,089,049, Cl. 363-17.000.

Soot, Olaf. Nuclear fuel storage rack. 4,088,897, Cl. 250-507.000.

Sorokin, Nikolai Alexeevich: *See*—
Popov, Gennady Petrovich; Mikhailidi, Alexandr Konstantinovich; Lavrentiev, Konstantin Andreevich; Popov, Ivan Grigorievich; Zhukov, Viktor Vasilievich; and Sorokin, Nikolai Alexeevich, 4,088,609, Cl. 252-512.000.

Soteropulos, Gust, to Deere & Company. Elastic bale-forming conveyor for cylindrical bales. 4,088,069, Cl. 100-88.000.

Souda, Kiyoshi: *See*—
Sogabe, Itsushi; and Souda, Kiyoshi, 4,088,285, Cl. 244-16.000.

Southard, Charles J.: *See*—
McElroy, David J.; Tubbs, Graham S.; and Southard, Charles J., 4,089,062, Cl. 364-700.000.

Southwire Company: *See*—
Linne, Robert Steven, 4,087,898, Cl. 29-527.500.

Spak, Anthony J.; and Yu, Arthur J., to Stauffer Chemical Company. Method of reducing gel time of polyester thermoset resins and product thereof. 4,088,710, Cl. 260-870.000.

Spange, Arno: *See*—
Meininger, Fritz; Noll, Walter; and Spange, Arno, 4,088,441, Cl. 8-1.00P.

Spector, George: *See*—
Schrock, Maurice D.; and Spector, George, 4,087,911, Cl. 30-286.000.

Speier, John L.: *See*—
Malek, James R.; Speier, John L.; and Wright, Antony P., 4,088,669, Cl. 260-448.80R.

Spence, Forrest. Shag rug brushing and object retrieving device. 4,087,879, Cl. 15-142.000.

Spengler, Charles J., to Westinghouse Electric Corp. Hot corrosion resistant fabricable alloy. 4,088,479, Cl. 75-171.000.

Sperline, Paul D., to SPS Instrument Company. Engine idle control. 4,088,110, Cl. 123-198.0DB.

Sperry Rand Corporation: *See*—
Zipser, Randall E.; Butler, Gene R.; and Grey, Donald M., 4,088,231, Cl. 214-6.00B.

Spies, Philip E., to National Instrument Company, Inc. Crimping mechanism for an electric capping machine. 4,087,952, Cl. 53-334.000.

SPS Instrument Company: *See*—
Sperline, Paul D., 4,088,110, Cl. 123-198.0DB.

Spurlock, James W. Cluster screen for sand control. 4,088,580, Cl. 210-323.00T.

Spurrier, Francis R.: *See*—
Thompson, Robert E.; Spurrier, Francis R.; and Jones, Andrew R., 4,088,535, Cl. 176-87.000.

Stahl, Hubert: *See*—
Roll, Karl; Hettich, Alfred; Stahl, Hubert; and Keil, Werner, 4,088,197, Cl. 173-12.000.

Staley, James G., to GTE Sylvania Incorporated. Electrical circuit arrangement for filtering motor brush noise. 4,088,972, Cl. 318-532.000.

Stamm, Dietrich: *See*—
Klopsch, Herbert; Lobert, Klaus; and Stamm, Dietrich, 4,088,900, Cl. 307-149.000.

Standard Oil Company (Indiana): *See*—
Reed, Robert L.; Palm, John W.; and Ruth, Ralph G., 4,088,744, Cl. 423-573.00G.

Standard Pressed Steel Co.: *See*—
Dey, Ervin J., 4,088,355, Cl. 292-251.000.

Staples, Bruce A.: *See*—
Thomas, Thomas R.; Staples, Bruce A.; and Murphy, Llewellyn P., 4,088,737, Cl. 423-240.000.

Stark, Olof S.; and Martensson, Kjell H., to AB Ziristor. Parallelepipedic packing container together with a method for its manufacture. 4,088,260, Cl. 229-17.00R.

Stark, Walter: *See*—
Ratz, Adolf; Wilhelm, Adolf; Odenwald, Gerhard; Frank, Siegfried; and Stark, Walter, 4,088,047, Cl. 76-112.000.

Starr, Frank, to Koller Die and Tool Co. Combined rotary progressive die. 4,088,005, Cl. 72-404.000.

Stauffer Chemical Company: *See*—
Gaughan, Edmund J., 4,088,687, Cl. 260-557.00R.
Spak, Anthony J.; and Yu, Arthur J., 4,088,710, Cl. 260-870.000.

Steenhoek, Dwayne K. Pipe end shaper tool. 4,087,997, Cl. 72-122.000.

Stefan, Silviu: *See*—
Barna, Gheorghe; Stefan, Silviu; Suselescu, Mircea; Barbu, Cornelius; Chiose, Sergiu; Lebada, Ioan; and Negulescu, Florian, 4,089,056, Cl. 364-551.000.

Stehlik, Gerhard: *See*—
Morlock, Gerhard; and Stehlik, Gerhard, 4,088,597, Cl. 252-106.000.

Steiger, Alfred: *See*—
Leimbacher, Erwin; Siegrist, Otto; and Steiger, Alfred, 4,088,440, Cl. 8-2.50A.

Steilen, Ronald Michael: *See*—
Schreiner, Lester Dale; and Steilen, Ronald Michael, 4,088,346, Cl. 280-656.000.

Stein, Anthony C., Jr. Telephone call timer. 4,088,839, Cl. 179-7.10R.

Steinke, Leo; and Tosch, Josef, to Robert Bosch GmbH. Method to manufacture glow plugs, particularly to secure glow elements in sockets. 4,087,904, Cl. 29-611.000.

Sterling, John E.: *See*—
Schumacher, Frank A.; and Sterling, John E., 4,087,987, Cl. 62-276.000.

Stevens, Peter: *See*—
Deuber, John Martin; and Stevens, Peter, 4,088,549, Cl. 204-43.00G.

Stevens, Troy Franklin. Safety protection circuit. 4,089,031, Cl. 361-50.000.

Stewart-Warner Corporation: *See*—
Hickman, Ronald J., 4,088,247, Cl. 222-180.000.

Stimulation Technology, Inc.: *See*—
Niemi, Bill Hov ard, 4,088,141, Cl. 128-421.000.

Stirling, Irene: *See*—
Howarth, Thomas Trefor; and Stirling, Irene, 4,088,656, Cl. 260-307.0FA.

Stitch, Malcolm Lane, to Jersey Nuclear-Avco Isotopes, Inc. Rotating optical frequency chirp device. 4,088,898, Cl. 307-88.300.

Stochel, Nathan Harold: *See*—
Lee, James Patrick, Jr.; Raffa, Joseph Anthony; Sansone, Frank Peter; and Stochel, Nathan Harold, 4,089,051, Cl. 364-200.000.

Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, to Vish Minno-Geoloshki Institute- Nis. Material treating apparatus including pneumo-hydraulic vibrator. 4,088,716, Cl. 261-64.00R.

Stoffel, Paul J.; and Schumacher, Ignatius, to Monsanto Company. Agricultural procedure. 4,088,472, Cl. 71-92.000.

Stoll, Kurt; and Hihn, Gerhard. Piston/cylinder assemblies. 4,088,061, Cl. 91-26.000.

Stoner, Jesse A., to General Electric Company. Method of attaching components of a dynamoelectric machine. 4,087,903, Cl. 29-596.000.

Storen- und Maschinenfabrik Emil Schenker AG: *See*—
Schluep, Rene; and Koch, Josef, 4,088,171, Cl. 160-170.000.

Strathearn Audio Limited: *See*—
Buchanan, Donald George; and Jones, Roderick Frank, 4,088,902, Cl. 307-241.000.

Strauss, James Edgar: *See*—
Fischer, Allen Herbert; and Strauss, James Edgar, 4,088,383, Cl. 339-111.000.

Stringer, Theodore H., III: *See*—
Garrett, Wayne H.; Stringer, Theodore H., III; and Zbikowski, Ted, 4,088,206, Cl. 188-196.00D.

Strobel, Manfred: *See*—
Knappstein, Johannes; and Strobel, Manfred, 4,088,233, Cl. 214-23.000.

Strobel, William Karl: *See*—
Gatto, Donald Frederick; Milciunas, Juan; Strobel, William Karl; Krolak, Leo Vincent; and Varasse, Pete, 4,089,044, Cl. 361-422.000.

Strobel, Wolfgang: *See*—
Lederer, Michael; and Strobel, Wolfgang, 4,088,712, Cl. 260-878.00R.

Strongin, Ned, to Mattel, Inc. Doll having viewable internal organs with manually operated bellows and pump. 4,087,933, Cl. 46-44.000.

Sublistatic Holding S. A.: *See*—
Hugelin, Bernard; Blanc, Claude-Alain; and Serex, Charles, 4,088,442, Cl. 8-2.50A.

Suehiro, Akio: *See*—
Nakata, Kazuo; Ichikawa, Akira; and Suehiro, Akio, 4,088,838, Cl. 179-2.00A.

Suga, Gojiro; and Hirasaki, Takashi, to Xerox Corporation. Optical printer with character magnification. 4,089,008, Cl. 354-5.000.

Sugai Chemical Industry Company Limited: *See*—
Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, 4,088,702, Cl. 568-747.000.

Sugawara, Hiroyuki: *See*—
Abe, Nobuo; and Sugawara, Hiroyuki, 4,088,860, Cl. 200-144.00B.

Sugawara, Toshiaki: *See*—
Ishida, Torao; Nishimura, Daikichi; Sugawara, Toshiaki; and Ooka, Tadaaki, 4,088,646, Cl. 544-313.000.

Sugier, Andre: *See*—
Courty, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Sugier, Andre, 4,088,736, Cl. 423-230.000.

Sugihara, Nobuhiro: *See*—
Ohba, Shintaro; Hirose, Nobuhiko; Sugihara, Nobuhiro; and Aikawa, Takayuki, 4,087,889, Cl. 24-129.00W.

Sugimoto, Kenji: *See*—
Ishizuka, Shinichi; and Sugimoto, Kenji, 4,087,890, Cl. 29-27.00C.

Sukornick, Bernard; and Beal, James B., to Allied Chemical Corporation. Oxidizing halogen composition. 4,088,517, Cl. 149-1.000.

Sulzer Brothers Ltd.: *See*—
Chen, Yian Nian; Brugger, Marcel; Maurer, Friedrich; and Meyer, Alfred, 4,088,157, Cl. 139-1.00R.
Sandmeier, Willi; and Uebelhart, Willi, 4,088,559, Cl. 204-297.00W.

Sumi, Yasuaki, to Sanyo Electric Co., Ltd.; and Tottori Sanyo Electric Co., Ltd. Multiple-band digital frequency synthesizer receiver. 4,088,959, Cl. 325-459.000.

Sumitomo Chemical Company, Limited: *See*—
Saito, Mitsuru; Nakamura, Toshihide; and Ogura, Shinichi, 4,088,985, Cl. 340-237.00R.

Sumitomo Electric Industries, Ltd.: *See*—
Nakahara, Tsuneo; Hoshikawa, Masao; Shiraishi, Satoshi; Kurosaki, Shiro; and Fujiwara, Kunio, 4,088,388, Cl. 350-96.300.

Sumitomo Metal Industries, Ltd.: *See*—
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu; Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, 4,088,213, Cl. 193-40.000.

Sun Chemical Corporation: *See—*
Saltzman, Ronald; Ferrara, William J.; and Wasilewski, Olgierd, 4,088,618, Cl. 260-24.000.
Sunouchi, Akio: *See—*
Date, Nobuaki; Watanabe, Yoshiaki; Sunouchi, Akio; Mashimo, Yukio; Ito, Fumio; and Ito, Tadashi, 4,089,011, Cl. 354-23.00D.
Suntec Systems, Inc.: *See—*
Anderson, Donald E., 4,088,120, Cl. 126-271.000.
Suntech, Inc.: *See—*
Norton, Richard V., 4,088,723, Cl. 264-45.500.
Suominen, Lennart Eino Olavi, to J. W. Suominen OY. Method of densifying needled non-woven webs. 4,088,520, Cl. 156-73.600.
Superior Concrete Accessories, Inc.: *See—*
Turner, Norman G., 4,087,947, Cl. 52-125.000.
Supnet, Fred L. Method of fabricating mask-over-copper printed circuit boards. 4,088,545, Cl. 204-15.000.
Surgical Appliance Industries, Inc.: *See—*
Applegate, Leslie T., 4,088,130, Cl. 128-80.00F.
Susdorf, Robert A.: *See—*
Armstrong, Frederick J.; and Susdorf, Robert A., 4,088,177, Cl. 164-109.000.
Suselescu, Mircea: *See—*
Barna, Gheorghe; Stefan, Silviu; Suselescu, Mircea; Barbu, Cornelius; Chiose, Sergiu; Lebada, Ioan; and Negulescu, Florian, 4,089,056, Cl. 364-551.000.
Sutton, John T., to Keyes Fibre Company. Die-dried molded pulp egg carton. 4,088,259, Cl. 229-2.5EC.
Sutton, Otis Benjamin. Golf swing training device. 4,088,325, Cl. 273-187.00R.
Suzuki, Akimitsu: *See—*
Tanaka, Tuneo; Ishizuka, Sengo; Tokuda, Keniti; and Suzuki, Akimitsu, 4,088,507, Cl. 106-288.00Q.
Suzuki, Hiroshi; Ito, Yukio; and Yasumoto, Yosiro, to Agency of Industrial Science & Technology. Builder for detergent. 4,088,611, Cl. 252-541.000.
Suzuki, Koushichi: *See—*
Kubo, Masatoshi; Hara, Toshito; Hayashi, Yuji; Kassai, Makoto; Matsumoto, Norio; Nishi, Tsuneyoshi; Suzuki, Koushichi; Kodama, Michiko; and Sintani, Kaduwo, 4,088,803, Cl. 427-123.000.
Suzuki, Seiichi; and Endo, Tomizo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Flow control valve for hot pitch or other viscous material. 4,088,300, Cl. 251-319.000.
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, to Sony Corporation. Inverter circuit including transformer with shielding of undesired radiations. 4,089,049, Cl. 363-17.000.
Suzuki, Teruki; Tanimizu, Shinkichi; and Ohno, Yukio, to Hitachi, Ltd. Terbium-activated alkaline-earth metal silicate phosphors. 4,088,599, Cl. 252-301.40F.
Suzuki, Toshihiro: *See—*
Sakata, Nobuhiro; and Suzuki, Toshihiro, 4,088,807, Cl. 428-334.000.
Suzuki, Yasoji; Shigematsu, Tomohisa; Kokado, Nawoyuki; and Kudo, Yukinori, to Tokyo Shibaura Electric Co., Ltd. Integrated circuit for a programmable television receiver. 4,088,958, Cl. 325-396.000.
Svirin, Dmitry Andreyanovich: *See—*
Komarov, Jury Ivanovich; Svirin, Dmitry Andreyanovich; Titov, Dmitry Vladimirovich; and Lukhmanov, Viktor Mikhailovich, 4,088,159, Cl. 139-194.000.
Swann, Brian Picton: *See—*
Evans, Delme; Jolley, Michael Ralph John; Ross, William James; and Swann, Brian Picton, 4,088,773, Cl. 424-274.000.
Sweeney, William T.: *See—*
Umphrey, Ronald W.; Plate, Thomas H.; McCain, David L.; and Sweeney, William T., 4,089,053, Cl. 366-349.000.
Swinehart, Robert L.; and Patrick, Paul N., to P.N. Patrick Company, Inc. Device for holding and masking post-type earrings during the coating thereof. 4,088,560, Cl. 204-297.00W.
Syak, Charles W., to Syro Steel Company. Glare screen blade. 4,088,415, Cl. 404-6.000.
Syntex (U.S.A.) Inc.: *See—*
Roszkowski, Adolph P.; Beard, Colin C.; Dvorak, Charles; and Weinhardt, Klaus, 4,088,771, Cl. 424-273.00R.
Syro Steel Company: *See—*
Syak, Charles W., 4,088,415, Cl. 404-6.000.
Systron-Donner Corporation: *See—*
Flanner, Philip D., 4,088,026, Cl. 73-497.000.
Szafianski, Marius. Depressurized tethered tennis ball training device. 4,088,316, Cl. 273-29.00A.
Szymanis, Edward, to Canadian General Electric Company Limited. Rotary lawn mower with improved grass collector. 4,087,955, Cl. 56-202.000.
Taintor, Oliver E. Manually controlled semi-automatic step gear transmission. 4,088,044, Cl. 74-765.000.
Takahashi, Kazuya: *See—*
Machida, Fujio; and Takahashi, Kazuya, 4,088,963, Cl. 330-284.000.
Takahashi, Kentaro: *See—*
Takao, Tsutomu; and Takahashi, Kentaro, 4,088,476, Cl. 75-123.0CB.
Takahashi, Noriyuki; and Nishikawa, Masao, to Honda Giken Kogyo Kabushiki Kaisha. Hydraulic speed change gear having an automatic pressure control device. 4,087,969, Cl. 60-464.000.
Takahata, Kosaku, legal successor: *See—*
Hasegawa, Hiroshi; Ohtsubo, Yoshiaki; Watanabe, Sakuji; and Takahata, Kouichi, deceased, 4,089,013, Cl. 354-33.000.
Takahata, Kouichi, deceased: *See—*
Hasegawa, Hiroshi; Ohtsubo, Yoshiaki; Watanabe, Sakuji; and Takahata, Kouichi, deceased, 4,089,013, Cl. 354-33.000.
Takamori, Shigeru; Yamashita, Kazutaka; and Kono, Yoshinao, to Kao Soap Co., Ltd. Resin composition for powder coatings. 4,088,707, Cl. 260-835.000.
Takamura, Masayuki: *See—*
Sata, Takeo; Takamura, Masayuki; Shinoda, Norio; and Hatae, Masataka, 4,087,893, Cl. 29-157.30A.
Takano, Hiroshi: *See—*
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, 4,088,391, Cl. 350-150.000.
Takao, Tsutomu; and Takahashi, Kentaro, to Nippon Piston Ring Co., Ltd. Abrasion-resistant cast irons. 4,088,476, Cl. 75-123.0CB.
Takats, Ferenc: *See—*
Kocsanyi, Laszlo; Varga, Lajos; Kovacs, Marton; Takats, Ferenc; and Kalo, Gyorgy, 4,088,579, Cl. 210-82.000.
Takeda Chemical Industries, Ltd.: *See—*
Inanaga, Kazutoyo; and Miyamoto, Yoshio, 4,088,755, Cl. 424-177.000.
Takemura, Makoto: *See—*
Tanaka, Masao; Takemura, Makoto; and Ito, Nobuei, 4,088,608, Cl. 252-466.0PT.
Takeuchi, Tsutomu: *See—*
Murase, Yoshitaka; Okada, Noboru; Yoshikawa, Iwashiro; Takeuchi, Tsutomu; and Yamashita, Hisakuni, 4,088,527, Cl. 156-502.000.
Takewell, Robert B., to J. M. Huber Corporation. Carbon black process. 4,088,741, Cl. 423-450.000.
Takezono, Takashi; and Kanie, Takashi, to Fujitsu Limited. Memory apparatus with defective modules. 4,089,063, Cl. 365-200.000.
Tamm, Rolf Gunther Arnold: *See—*
Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, 4,088,446, Cl. 23-230.00R.
Tamura, Motohiko: *See—*
Uda, Kazumi; Tamura, Motohiko; Nishiura, Ichiro; and Fujiike, Hiroshi, 4,088,465, Cl. 62-54.000.
Tanaka, Kiyoshi: *See—*
Nakazawa, Kichi; Okamoto, Masafumi; Tanaka, Kiyoshi; and Sakazaki, Tadashi, 4,088,513, Cl. 148-112.000.
Tanaka, Masao; Takemura, Makoto; and Ito, Nobuei, to Nippon Soken, Inc. Catalysts for reforming hydrocarbon fuels. 4,088,608, Cl. 252-466.0PT.
Tanaka, Shunsaku: *See—*
Goto, Hideo; Shibamoto, Nobuyori; and Tanaka, Shunsaku, 4,088,702, Cl. 568-747.000.
Tanaka, Tomoyuki, to Hitachi, Ltd. Semiconductor switching device. 4,089,024, Cl. 357-38.000.
Tanaka, Toyozo, to Unitika Limited. Method and apparatus for removing waste settling under carding machine or the like. 4,087,888, Cl. 19-107.000.
Tanaka, Tuneo; Ishizuka, Sengo; Tokuda, Keniti; and Suzuki, Akimitsu, to Toyo Ink Manufacturing Co., Ltd. Phthalocyanine pigment compositions. 4,088,507, Cl. 106-288.00Q.
Tanba, Yoshihiro: *See—*
Ichimura, Hideziro; Tsuchiya, Shizuo; and Tanba, Yoshihiro, 4,088,616, Cl. 260-2.5AY.
Tange, Fumiko: *See—*
Tsuda, Kiichi; and Tange, Fumiko, 4,087,951, Cl. 53-198.00A.
Tangorra, Giorgio: *See—*
Gallizia, Achille; and Tangorra, Giorgio, 4,088,523, Cl. 156-125.000.
Tani, Tadaaki, to Fuji Photo Film Co., Ltd. Sulfur-sensitized AgX emulsion containing cubic AgX grains and a mercaptan sensitizer. 4,088,494, Cl. 96-107.000.
Tanigawa, Kou; and Ochiai, Takeshi, to Fujitsu Ten Limited; and Toyota Jidosha Kogyo Kabushiki Kaisha. Warning display system for vehicles. 4,088,980, Cl. 340-52.00F.
Tanimizu, Shinkichi: *See—*
Suzuki, Teruki; Tanimizu, Shinkichi; and Ohno, Yukio, 4,088,599, Cl. 252-301.40F.
Tantera, Inc.: *See—*
Clark, Franklin T., Jr., 4,087,880, Cl. 15-175.000.
Taran, George D. Bracelet. 4,087,989, Cl. 63-11.000.
Tassoney, Joseph P.: *See—*
Choi, Charles K.; Gundzik, Richard M.; and Tassoney, Joseph P., 4,088,541, Cl. 202-99.000.
Taylor, Allen L.; and Sheffield, William F., to Minnesota Mining and Manufacturing Company. Machine and method for poling films of pyroelectric and piezoelectric material. 4,089,034, Cl. 361-233.000.
Taylor, Billy E., to Rockwell International Corporation. Apparatus for feeding cable wires through an electrical connector grommet. 4,087,907, Cl. 29-721.000.
Taylor, Christopher, to Molehurst Limited. Road studs. 4,088,416, Cl. 404-16.000.
Taylor, Don A.; and Buehrle, Victor E. Method and apparatus for continuously applying tread material to tire casings and curing the same. 4,088,524, Cl. 156-129.000.
Taylor-Dunn Manufacturing Company: *See—*
Van Doren, Robert L., 4,088,852, Cl. 200-1.00R.
TBW Ind. Inc.: *See—*
White, Charles F., 4,088,373, Cl. 302-53.000.
Tebben, Lloyd W., to Acrometal Products, Inc. Perimeter safety switch mounted to support disposed remote from machine body. 4,088,856, Cl. 200-52.00R.

Tech, Donald D., to Antech Industries. Acoustically responsive signal injection system for headphone users. 4,088,836, Cl. 179-1.0MN.
Technar, Inc.: *See—*
Bell, Lon E., 4,088,976, Cl. 337-107.000.
Teger, Gerhard: *See—*
Lippacher, Wolfgang; Deutschenbaur, Paul; and Teger, Gerhard, 4,088,054, Cl. 85-84.000.
Termont, Charles George, to Deere & Company. Environmental control system and cab combination. 4,088,364, Cl. 296-28.00C.
Teulon, Jean-Marie, to Societe Hexachimie. Indane ethanols. 4,088,787, Cl. 424-343.000.
Texaco Development Corporation: *See—*
Watts, Lewis W., Jr., 4,088,700, Cl. 260-611.00R.
Texaco Inc.: *See—*
Howard, Curtis E.; and Calvin, Douglas G., 4,088,187, Cl. 166-264.000.
Mead, Theodore C.; and Odell, Norman R., 4,088,566, Cl. 208-90.000.
Shupe, Russell D., 4,088,189, Cl. 166-272.000.
Watts, Leonard R.; and Brewer, Norman L., 4,088,565, Cl. 208-33.000.
Widmyer, Richard H., 4,088,188, Cl. 166-269.000.
Wiese, Harry C.; Denchfield, Jerrold R.; Ahlborn, John C., deceased; and Ahlborn, Lloyd Keys, executor, 4,088,453, Cl. 44-51.000.
Texas Instruments Incorporated: *See—*
McElroy, David J.; Tubbs, Graham S.; and Southard, Charles J., 4,089,062, Cl. 364-700.000.
Textron, Inc.: *See—*
Caswell, Berwyn B., 4,088,284, Cl. 244-7.00R.
Thacker, Howard E. Demountable ramp structure for dump trucks and similar vehicles. 4,088,235, Cl. 214-85.000.
Theeuwes, Felix; Saunders, Richard J.; and Mefford, Wayne S., to Alza Corporation. Process for forming outlet passageways in pills using a laser. 4,088,864, Cl. 219-121.0LM.
Thomas, Herbert: *See—*
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,088,780, Cl. 424-300.000.
Thomas, Thomas R.; Staples, Bruce A.; and Murphy, Llewellyn P., to United States of America, Energy. Dry method for recycling iodine-loaded silver zeolite. 4,088,737, Cl. 423-240.000.
Thomasson, Charles Victor: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,088,471, Cl. 65-182.00R.
Thompson, Robert E.; Spurrier, Francis R.; and Jones, Andrew R., to Westinghouse Electric Corp. Mobile nuclear reactor containment vessel. 4,088,535, Cl. 176-87.000.
Thompson, Roger F.: *See—*
Banka, Eugene F.; and Thompson, Roger F., 4,088,879, Cl. 235-449.000.
Thomson-CSF: *See—*
Assouline, Georges; Hareng, Michel; Roncillat, Michel; and Leiba, Eugene, 4,088,400, Cl. 353-20.000.
Deschamps, Jacques, 4,088,925, Cl. 315-13.0ST.
Jourdan, Francis; Lepeytre, Jean-Paul; Masson, Andre; and Le Roux, Charles, 4,088,397, Cl. 350-253.000.
LeCardonnel, Gerard; Gravez, Pierre; and Favre, Rene Marc, 4,088,993, Cl. 340-347.0AD.
Thornburgh, William F., to General Motors Corporation. Engine control assembly. 4,087,965, Cl. 60-277.000.
Thurlow, Norman Thorogood: *See—*
Rogers, Alastair Stanley; and Thurlow, Norman Thorogood, 4,088,843, Cl. 179-70.000.
Thurmond, George R. Feedback elimination system employing notch filter. 4,088,834, Cl. 179-1.0FS.
Thurmond, George R.; and Heinz, Harro K., to Rauland-Borg Corporation, by said Harro K. Heinz. Comprehensive feedback elimination system employing notch filter. 4,088,835, Cl. 179-1.0FS.
Timm, Franklin E.: *See—*
Balmat, Jack S.; and Timm, Franklin E., 4,088,160, Cl. 140-2.000.
Titov, Dmitry Vladimirovich: *See—*
Komarov, Jury Ivanovich; Svirin, Dmitry Andreyanovich; Titov, Dmitry Vladimirovich; and Lukhmanov, Viktor Mikhailovich, 4,088,159, Cl. 139-194.000.
Tkach, Khaim Berkovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Plavskikh, Vladimir Dmitrievich; Klimashko, Vladimir Vasilievich; Rozhkov, Leonid Georgievich; Grigoraschenko, Vladimir Alexandrovich; Filippov, Vasily Vasilievich; Lipovetsky, Lazar Moiseevich; Ardyshev, Valentin Nikitich; and Tkach, Khaim Berkovich, 4,088,720, Cl. 264-32.000.
TMC Corporation: *See—*
Krob, Erwin, 4,088,343, Cl. 280-625.000.
Todisco, Joseph G.: *See—*
Di Maio, Anthony E.; and Todisco, Joseph G., 4,088,004, Cl. 72-391.000.
Toivanen, Toivo Adrian: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.
Tokico Ltd.: *See—*
Haraikawa, Tetsuo, 4,088,204, Cl. 188-71.700.
Kato, Tetuo, 4,088,207, Cl. 188-322.000.
Tokuda, Keniti: *See—*
Tanaka, Tuneo; Ishizuka, Sengo; Tokuda, Keniti; and Suzuki, Akimitsu, 4,088,507, Cl. 106-288.00Q.
Tokura, Naomi; and Okamura, Kenji, to Nissan Motor Company, Limited. Air/fuel ratio control system in internal combustion engine. 4,088,100, Cl. 123-119.0EC.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Suzuki, Yasoji; Shigematsu, Tomohisa; Kokado, Nawoyuki; and Kudo, Yukinori, 4,088,958, Cl. 325-396.000.
Tomforde, Johann: *See—*
Gallitzendorfer, Josef; Pfeiffer, Peter; Tomforde, Johann; and Gotz, Hans, 4,088,366, Cl. 296-154.000.
Tomida, Masayuki: *See—*
Shigematsu, Taichiro; Shibahara, Tetsuya; Nakazawa, Makoto; Tomida, Masayuki; and Munakata, Toshio, 4,088,767, Cl. 424-269.000.
Tomioka, Kunio; Kita, Masaaki; and Sakurai, Terushige, to Kabushiki Kaisha Komatsu Seisakusho. Hot forging machine having die preheating unit. 4,088,000, Cl. 72-342.000.
Tonkyn, Richard G.; and Vorchheimer, Norman, to Betz Laboratories, Inc. Cationic chlorine-resistant polymeric flocculants and their use. 4,088,613, Cl. 260-2.0BP.
Torburn, Roy B., to GTE Automatic Electric Laboratories Incorporated. Support for hybrid substrate carrying electrical circuit patterns and elements. 4,089,042, Cl. 361-412.000.
Tosch, Josef: *See—*
Steinke, Leo; and Tosch, Josef, 4,087,904, Cl. 29-611.000.
Toth, John F.: *See—*
Fassett, Matthew; Hansen, Russell W.; Toth, John F.; and Ventresca, Pietro, 4,088,970, Cl. 333-31.00R.
Tottori Sanyo Electric Co., Ltd.: *See—*
Sumi, Yasuaki, 4,088,959, Cl. 325-459.000.
Townsend, Douglas W. Electrolytic method and apparatus for refractory metals using a hollow carbon electrode. 4,088,548, Cl. 204-39.000.
Toyo Ink Manufacturing Co., Ltd.: *See—*
Tanaka, Tuneo; Ishizuka, Sengo; Tokuda, Keniti; and Suzuki, Akimitsu, 4,088,507, Cl. 106-288.00Q.
Toyoda, Nobuyuki: *See—*
Hara, Tohru; Mihara, Minoru; and Toyoda, Nobuyuki, 4,088,514, Cl. 148-171.000.
Toyomatsu, Masafumi: *See—*
Fukuda, Yoshihiko; Ishimori, Hidefumi; Toyomatsu, Masafumi; Tsubone, Masayoshi; Mizuguchi, Hideki; and Masuda, Hideo, 4,088,434, Cl. 425-467.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Ishikawa, Masakazu; Shibatani, Juichi; Oka, Hiroyuki; Mitsuoka, Naomi; and Matsuda, Mitsuo, 4,088,001, Cl. 72-370.000.
Kato, Takashi, 4,088,102, Cl. 123-119.00R.
Miyagi, Hideo, 4,087,964, Cl. 60-276.000.
Tanigawa, Kou; and Ochiai, Takeshi, 4,088,980, Cl. 340-52.00F.
Wakita, Nobuaki, 4,088,101, Cl. 123-119.00A.
Tozzolino, Pierre, to Societe Nationale Elf Aquitaine (Prod.). Sulphonium compounds and their application. 4,088,781, Cl. 424-303.000.
Trautwein, Wolfgang. Stabilized three-wheeled vehicle. 4,088,199, Cl. 180-25.00R.
Traver, Frank J.: *See—*
Brown, Edgar D., Jr.; and Traver, Frank J., 4,088,591, Cl. 252-75.000.
Tred-X Corporation: *See—*
Neal, Duward Harding, 4,088,521, Cl. 156-96.000.
Treuner, Uwe D.; and Breuer, Hermann, to E. R. Squibb & Sons, Inc. 3-Heterothio substituted 7-(ureido-heteroacetyl) cephalosporins. 4,088,816, Cl. 544-27.000.
Treuner, Uwe D.: *See—*
Breuer, Hermann; and Treuner, Uwe D., 4,088,815, Cl. 544-26.000.
Trilling, Ted R. Self biasing differential amplifier. 4,088,962, Cl. 330-261.000.
Tsai, Yih-Wan, to PPG Industries, Inc. Regenerator flow control. 4,088,180, Cl. 165-1.000.
Tsubone, Masayoshi: *See—*
Fukuda, Yoshihiko; Ishimori, Hidefumi; Toyomatsu, Masafumi; Tsubone, Masayoshi; Mizuguchi, Hideki; and Masuda, Hideo, 4,088,434, Cl. 425-467.000.
Tsuchiya, Shizuo: *See—*
Ichimura, Hideziro; Tsuchiya, Shizuo; and Tanba, Yoshihiro, 4,088,616, Cl. 260-2.5AY.
Tsuda, Kiichi; and Tange, Fumiko. Binding device for fastening the openings of bags or the like. 4,087,951, Cl. 53-198.00A.
Tsunemoto, Shiro; Mizuguchi, Teruki; and Hirayama, Eiichi, to Fuji Plastic Co., Ltd. Control apparatus. 4,088,064, Cl. 92-13.600.
Tubbs, Graham S.: *See—*
McElroy, David J.; Tubbs, Graham S.; and Southard, Charles J., 4,089,062, Cl. 364-700.000.
Tuegel, John L.: *See—*
Kaebitzsch, Johannes W.; and Tuegel, John L., 4,088,067, Cl. 99-379.000.
Tuominen, Tapio Kalevi: *See—*
Noponen, Veikko H.; Makipirtti, Simo A.; Malmstrom, Rolf E.; Tuominen, Tapio Kalevi; Aaltonen, Olavi August; Kaasila, Kauko Johannes; Toivanen, Toivo Adrian; Harkki, Seppo Untamo; and Niemela, Toivo Isak, 4,088,310, Cl. 266-162.000.
Turner, Norman G., to Superior Concrete Accessories, Inc. Edge-lifting system for a concrete slab. 4,087,947, Cl. 52-125.000.
Tutein, Thomas R.; Harrington, Anne E.; and Jacob, Jose T., to

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Smith, Don H., 4,089,035, Cl. 361-251.000.
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Ueno, Toyoaki; and Uchida, Masashi, 4,088,178, Cl. 164-314.000.
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Ebihara, Heihachiro; and Uchino, Misao, 4,087,958, Cl. 58-25.000.
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Sandmeier, Willi; and Uebelhart, Willi, 4,088,559, Cl. 204-297.00W.
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Miyasaka, Kenzi; Murata, Mitsuhiro; and Uematsu, Hiroyuki, 4,087,957, Cl. 58-23.00R.
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Yeh, Chuen Y.; Bohn, F. Lewis; and Ulmer, Harry E., 4,088,703, Cl. 568-835.000.
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Sandner, Michael Ray; Rosemund, Walter Richard; and Carey, Ronald David, 4,088,615, Cl. 260-2.5AM.
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Fischer, Paul W.; Holm, LeRoy W.; and Pye, David S., 4,088,190, Cl. 166-274.000.
Hass, Robert H.; Hansford, Rowland C.; and Hennig, Harvey, 4,088,743, Cl. 423-539.000.
Pyle, Delbert E.; Pye, David S.; and Fischer, Paul W., 4,088,583, Cl. 252-8.50A.
Simpson, Howard D., 4,088,433, Cl. 425-464.000.
United Audio Visual Corporation: *See—*
Wells, William R., 4,089,028, Cl. 360-79.000.
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Clampitt, Roy; and Jefferies, Derek Kirk, 4,088,919, Cl. 313-362.000.
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Hauge, Douglas Oliver, 4,088,738, Cl. 423-319.000.
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Agriculture: *See—*
Kullman, Russell M. H.; and Reinhardt, Robert M., 4,088,443, Cl. 8-116.00P.
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Hayman, Robert A., 4,088,075, Cl. 102-70.20R.
Orlando, Carl, 4,089,016, Cl. 354-75.000.
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Anderson, Norman L., 4,088,561, Cl. 204-299.00R.
Basdekas, Demetrios L.; Macrae, George; and Walsh, Joseph M., 4,088,182, Cl. 165-32.000.
Cooper, Tom O.; and Miller, William E., 4,087,905, Cl. 29-623.100.
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Thomas, Thomas R.; Staples, Bruce A.; and Murphy, Llewellyn P., 4,088,737, Cl. 423-240.000.
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Huggett, George R.; and Slater, Larry E., 4,087,920, Cl. 33-367.000.
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Dickinson, Richard M. RF beam center location method and apparatus for power transmission system. 4,088,999, Cl. 343-113.00R.
Holley, Larry D.; and Mason, Jerry W. Microcomputerized electric field meter diagnostic and calibration system. 4,088,951, Cl. 324-130.000.
Shannon, Roger L.; and Gillette, Roger B. Plasma cleaning device. 4,088,926, Cl. 315-111.200.
Zebus, Paul P.; Packer, Poley N.; and Haynie, Cyrus C. Variable contour securing system. 4,088,312, Cl. 269-21.000.
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Anderson, Willard W.; and Groom, Nelson J., 4,088,018, Cl. 73-178.00R.
Barthlome, Donald E., 4,089,004, Cl. 343-786.000.
Beremand, Donald G.; Shure, Lloyd I.; and Mroz, Thaddeus S., 4,087,962, Cl. 60-39.650.
Blue, James W., 4,088,532, Cl. 176-11.000.
Burcher, Ernest E.; Katzberg, Stephen J.; and Kelly, William L., IV, 4,088,408, Cl. 356-120.000.
Delaplaine, Robert W.; and Mossolani, Daniel L., 4,088,291, Cl. 48-186.000.
Feltner, William R., 4,087,902, Cl. 29-571.000.
Howard, Wayne H., 4,088,094, Cl. 119-29.000.
Lauderslager, James B.; and Pacala, Thomas J., 4,088,965, Cl. 331-94.50G.
Maiden, Donald L., 4,088,270, Cl. 239-265.250.
Owens, Lester J., 4,087,975, Cl. 60-641.000.
Sawko, Paul M.; and Riccitiello, Salvatore R., 4,088,806, Cl. 428-332.000.
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Bradford, William C., 4,089,000, Cl. 343-7.0PF.
Crowley, James D.; Weller, Joseph F.; and Giallorenzi, Thomas G., 4,088,969, Cl. 333-30.00R.
Lewis, Adolph L., 4,088,387, Cl. 350-96.150.
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Rast, Howard E.; and Caspers, Hubert H., 4,088,884, Cl. 250-199.000.
San Miguel, Anthony, 4,088,240, Cl. 220-452.000.
Oregon: *See—*
Miles, Thomas R., 4,088,122, Cl. 126-271.20R.
U.S. Philips Corporation: *See—*
Barten, Piet Gerard Joseph, 4,088,930, Cl. 315-370.000.
Coulmance, Jean-Pierre Rene; and Six, Jean-Claude Gerard, 4,088,871, Cl. 219-497.000.
Manders, Lambertus Wilhelmus Johannes, 4,088,923, Cl. 313-487.000.
Potma, Theodorus Gerhardus; Bijkerk, Egbertus Nicolaas; and Quirijnen, Marius, 4,088,256, Cl. 226-74.000.
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Andrews, Laurance Richardson, 4,088,557, Cl. 204-224.00M.
Peters, George T.; Melikian, Gorken; and Biancardi, Frank R., 4,088,865, Cl. 219-121.00L.
Waehner, Glenn Carl, 4,088,928, Cl. 315-307.000.
Waters, James P., 4,088,890, Cl. 250-202.000.
Unitika Limited: *See—*
Tanaka, Toyozo, 4,087,888, Cl. 19-107.000.
University of California, The Regents of the: *See—*
Bettencourt, Thomas S., 4,088,570, Cl. 209-396.000.
University of Michigan, The Regents of the: *See—*
Voorhees, John J., 4,088,756, Cl. 424-180.000.
Uno, Naoyuki; and Kawasaki, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Dual function exposure time display and control circuit for SLR camera. 4,089,015, Cl. 354-51.000.
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Bunas, Bennie I., 4,088,540, Cl. 196-14.520.
Douglas, Walter M., 4,088,569, Cl. 208-206.000.
Schmerling, Louis, 4,088,820, Cl. 560-103.000.
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Bundy, Gordon L., 4,088,819, Cl. 560-61.000.
Callahan, William A.; Glenn, Eldridge Myles; and Rector, Douglas L., 4,088,766, Cl. 424-263.000.
Nelson, Norman A., 4,088,690, Cl. 260-586.00R.
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Robert, Andre, 4,088,784, Cl. 424-317.000.
Rolls, James P., 4,088,537, Cl. 195-51.00E.
Yankee, Ernest W., 4,088,663, Cl. 260-408.000.

Usami, Nobuo; and Kato, Taira, to Victot Company of Japan, Limited. Headphone unit incorporating microphones for binaural recording. 4,088,849, Cl. 179-156.00R.

Valek, John: *See—*
Miller, Roland E.; Scaletta, Joseph A.; and Valek, John, 4,088,086, Cl. 113-30.000.

van den Berg, Pieter: *See—*
Dail, John P., Jr.; and van den Berg, Pieter, 4,088,083, Cl. 111-13.000.

van der Lely, Cornelis. Soil cultivating implements. 4,088,084, Cl. 111-52.000.

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Van Doren, Robert L., to Taylor-Dunn Manufacturing Company. Motor speed control switch assembly. 4,088,852, Cl. 200-1.00R.

Van Peteghem, Antoine: *See—*
De Schepper, Achille; and Van Peteghem, Antoine, 4,088,733, Cl. 423-139.000.

Vapor Corporation: *See—*
Baker, Robert L., 4,088,938, Cl. 318-561.000.
Elguindy, Samir Mostafa; and Daugirdas, Kristupas, 4,087,939, Cl. 49-118.000.

Varasse, Pete: *See—*
Gatto, Donald Frederick; Milciunas, Juan; Strobel, William Karl; Krolak, Leo Vincent; and Varasse, Pete, 4,089,044, Cl. 361-422.000.

Varga, Lajos: *See—*
Kocsanyi, Laszlo; Varga, Lajos; Kovacs, Marton; Takats, Ferenc; and Kalo, Gyorgy, 4,088,579, Cl. 210-82.000.

Varian Associates, Inc.: *See—*
Engler, Clifford G.; and Sipirora, Joseph J., 4,088,944, Cl. 324-.5AH.

Vassilev, Vassil Vladimirov: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.

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Ehmig, Gerhard, 4,088,301, Cl. 251-334.000.

Vaughan, David Evan William; and Edwards, Grant Campbell, to W. R. Grace & Co. Process for preparing synthetic ferrierite. 4,088,739, Cl. 423-329.000.

Vaughan, Raymond C. Method and apparatus for generating steam. 4,087,974, Cl. 60-618.000.

VDO Adolf Schindling AG: *See—*
Schlick, Horst, 4,088,269, Cl. 239-133.000.

Veaux, Jacques: *See—*
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Vedrichkov, Petko Georgiev: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.

Velsicol Chemical Corporation: *See—*
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Ventresca, Pietro: *See—*
Fassett, Matthew; Hansen, Russell W.; Toth, John F.; and Ventresca, Pietro, 4,088,970, Cl. 333-31.00R.

Vermont American Corporation: *See—*
McCord, Wilfred M., Jr., 4,088,164, Cl. 144-252.00R.

Vesci, Anthony: *See—*
Perry, Francis James; and Vesci, Anthony, 4,089,007, Cl. 346-140.00R.

Vetco Offshore Industries, Inc.: *See—*
Baugh, Benton F., 4,088,152, Cl. 137-625.650.

Vickers Limited: *See—*
Smith, Francis Hughes, 4,088,410, Cl. 356-163.000.

Victory Engineering Corporation: *See—*
O'Neill, William J., 4,088,135, Cl. 128-348.000.

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Vish Minno-Geoloshki Institute- Nis: *See—*
Stoev, Stoycho Mitrev; Metodiev, Metodi Stoyanov; Kuzev, Lyubomir Vladimirov; Vedrichkov, Petko Georgiev; Sapunarov, Ivan Mitrev; Vassilev, Vassil Vladimirov; Dimitrov, Spas Petrov; Gasharov, Vihar Assenov; Russev, Sheko Kolev; and Mitrev, Kostadin Georgiev, 4,088,716, Cl. 261-64.00R.

Vlasek, David J.: *See—*
Callihan, Rudy B.; Bagley, Thomas E.; Warzecha, Alvin K.; and Vlasek, David J., 4,088,186, Cl. 166-241.000.

Vlattas, Isidoros, to Ciba-Geigy Corporation. 9-Oxaprostaglandins. 4,088,779, Cl. 424-285.000.

Vlcek, Karel; Pacakova, Zdena; Jirka, Bohuslav; Cesenek, Bedrich; and Jindra, Karel, to Elitex, koncern textilniho strojirenstvi. Portable facilities for automatically collecting and sorting wound spools from open-end spinning machines. 4,088,226, Cl. 209-82.000.

Voegele, William P., Jr. Top hinged sash assembly. 4,087,940, Cl. 49-397.000.

Vogel, Richard E.: *See—*
Bhat, Vasanth K.; Siegel, Allen E.; Vogel, Richard E.; and Burrows, Larry G., 4,088,105, Cl. 123-145.00A.

Vogt, Nils Anton: *See—*
Ryhman, Jens Olov; and Vogt, Nils Anton, 4,088,529, Cl. 162-65.000.

Vogt, Russell C., to St. Regis Paper Company. Multiwall pouch bags for detached packaging of commodities. 4,088,264, Cl. 229-55.000.

Vohringer, Gerhard Friedrich, to Elektrostatische-Spritz-und Beflockungsgesellschaft G.F. Vohringer GmbH. Electrostatic spray gun for powdered material. 4,088,268, Cl. 239-15.000.

Volgyi, Paul: *See—*
Kuechli, Gottfried; and Volgyi, Paul, 4,087,894, Cl. 29-179.000.

Volkswagenwerk Aktiengesellschaft: *See—*
Rupprecht, Kurt, 4,088,311, Cl. 267-74.000.

Volskova, Vera Alexeevna: *See—*
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

von Beckmann, Helmuth, to Canron, Inc. Continuous tamping device. 4,088,077, Cl. 104-12.000.

Vondrovsky, Gabriel: *See—*
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Von Knorring, Folke: *See—*
Dahle, Orvar; Von Knorring, Folke; Nordvall, Jan; and Siby, Sture, 4,088,013, Cl. 73-141.00A.

Voorhees, John J., to University of Michigan, The Regents of the. Pharmaceutical composition and process of treatment. 4,088,756, Cl. 424-180.000.

Vorbruggen, Helmut: *See—*
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Vorchheimer, Norman: *See—*
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Vorontsov, Alexandr Ivanovich: *See—*
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Vydrin, Vladimir Nikolaevich; Dukmasov, Vladimir Georgievich; and Davlyatshin, Garifulla. Device for automatic adjustment of roll gap in mill stand. 4,087,999, Cl. 72-245.000.

W & H Conveyor Systems, Inc.: *See—*
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W. & M. Automation Karl Muller: *See—*
Jacksch, Bruno; and Muller, Karl, 4,088,220, Cl. 198-472.000.

W. R. Grace & Co.: *See—*
Vaughan, David Evan William; and Edwards, Grant Campbell, 4,088,739, Cl. 423-329.000.
Wood, Louis L.; Murray, Jerome L.; and Gardiner, Frances R., 4,088,132, Cl. 128-285.000.

WABCO Westinghouse G.m.b.H.: *See—*
Frania, Josef; and Lehnert, Erhard, 4,088,205, Cl. 188-196.00D.
Lindemann, Klaus; Reinecke, Erich; and Weise, Lutz, 4,088,376, Cl. 303-96.000.

Wachi, Shigeaki: *See—*
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, 4,089,049, Cl. 363-17.000.

Wachter, Kenneth J.: *See—*
Banker, Robert O.; Brown, Charles T.; Ghaem-maghami, Sanjar; Holshouser, Howard E.; and Wachter, Kenneth J., 4,089,025, Cl. 358-10.000.

Wacker Chemie GmbH: *See—*
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Wada, Tsuneo: *See—*
Habu, Teiji; Korematsu, Shinobu; Wada, Tsuneo; Omura, Takayosi; Ishii, Hiroki; and Sasaki, Takashi, 4,088,495, Cl. 96-111.000.

Waddan, Dhafir Yusuf, to Imperial Chemical Industries Limited. Preparation of dicyanobutenes from 3-pentenenitrile. 4,088,672, Cl. 260-465.80R.

Waehner, Glenn Carl, to United Technologies Corporation. Regulated CRT power supply. 4,088,928, Cl. 315-307.000.

Wagner, Kuno: *See—*
Findeisen, Kurt; Wagner, Kuno; Schafer, Walter; and Hennig, Hans Joachim, 4,088,665, Cl. 260-453.0AM.

Wakasa, Isao: *See—*
Shono, Hiroaki; Wakasa, Isao; Kikuchi, Toshiaki; and Noji, Toshio, 4,088,467, Cl. 65-2.000.

Wakita, Nobuaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas purifying apparatus. 4,088,101, Cl. 123-119.00A.

Waldmann, Helmut: *See—*
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Walker, Lynn Charles, to Dow Chemical Company, The. Adiabatic calorimeter apparatus and method for measuring the energy change in a chemical reaction. 4,088,447, Cl. 23-230.00R.

Wallentowitz, Henning: *See—*
Mitschke, Manfred; and Wallentowitz, Henning, 4,088,939, Cl. 318-576.000.
Wallis, Bernard J. Chain drive for a workpiece transfer mechanism. 4,088,034, Cl. 74-37.000.
Walsh, Glenn. Decorative fountain. 4,088,880, Cl. 362-96.000.
Walsh, Joseph M.: *See—*
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Walton, Frank J.: *See—*
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Wandelmaier, Frank Wilhelm: *See—*
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Wargin, Robert V.; and Boyd, Clinton A., to Borg-Warner Corporation. Electrical cable with insulated and braid covered conductors and perforated polyolefin armor. 4,088,830, Cl. 174-113.00R.
Warner, Lawrence L. Portable electrical space heater. 4,088,870, Cl. 219-367.000.
Warzecha, Alvin K.: *See—*
Callihan, Rudy B.; Bagley, Thomas E.; Warzecha, Alvin K.; and Vlasek, David J., 4,088,186, Cl. 166-241.000.
Wasilewski, Olgierd: *See—*
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Wasmuth, Edward H.: *See—*
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Watanabe, Sakuji: *See—*
Hasegawa, Hiroshi; Ohtsubo, Yoshiaki; Watanabe, Sakuji; and Takahata, Kouichi, deceased, 4,089,013, Cl. 354-33.000.
Watanabe, Yoshiaki: *See—*
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Waters, James P., to United Technologies Corporation. Optical position detector. 4,088,890, Cl. 250-202.000.
Watkins, Gordon Leonard: *See—*
Caton, Michael Peter Lear; Coffee, Edward Charles John; and Watkins, Gordon Leonard, 4,088,695, Cl. 260-590.00C.
Watkins, Windell C., to Eastman Kodak Company. Dehydrogenation catalyst. 4,088,602, Cl. 252-437.000.
Watling, Leighton Harvey; and Henthorn, Donald R., to American Machine & Hydraulics, Inc. Quick release adapter and tool combination. 4,088,008, Cl. 72-481.000.
Watson, James Wilson, Jr.: *See—*
Cooper, Glenn Dale; and Watson, James Wilson, Jr., 4,088,634, Cl. 260-47.0ET.
Watson, Robert E.: *See—*
Miller, Bradley W.; Hickenlooper, Franklin T.; Uhlrich, David C.; Godfrey, Marl D.; Clifford, Douglas M.; James, Rex L.; Watson, Robert E.; Keith, John C.; and Mortensen, Alan C., 4,089,059, Cl. 364-706.000.
Watson, Robert L.; and Finley, Donald L., to Eastman Kodak Company. Method and apparatus for determining parameters of a staple length distribution of fibers in yarn slivers. 4,088,016, Cl. 73-160.000.
Watts, Edith B. Thread and bobbin storage case for existing sewing machine cabinets. 4,088,380, Cl. 312-237.000.
Watts, Leonard R.; and Brewer, Norman L., to Texaco Inc. Solvent dewaxing process. 4,088,565, Cl. 208-33.000.
Watts, Lewis W., Jr., to Texaco Development Corporation. Process for the hydrogenolysis of dioxolanes. 4,088,700, Cl. 260-611.00R.
Wavin B. V.: *See—*
de Putter, Warner Jan, 4,088,307, Cl. 366-75.000.
Weatherhead Company, The: *See—*
Scheffel, Gary W., 4,087,972, Cl. 60-548.000.
Weaver, James C.: *See—*
Seymour, Robert W.; Weaver, James C.; and Gray, Theodore F., Jr., 4,088,709, Cl. 260-860.000.
Wedemeyer, Karlfried: *See—*
Bohm, Siegfried; and Wedemeyer, Karlfried, 4,088,643, Cl. 260-192.000.
Weed, Howard S. Holder for microphones and the like. 4,088,848, Cl. 179-146.00R.
Wegmann & Co.: *See—*
Flemming, Karl-Heinz; and Grunewald, Peter, 4,088,058, Cl. 89-36.00K.
Weiberg, Otto: *See—*
Prescher, Gunter; Weiberg, Otto; Waldmann, Helmut; and Seifert, Hermann, 4,088,679, Cl. 260-502.00R.
Weidenbach, Guenther; Koepernik, Karl Hermann; and Brautigam, Hans, to Kali-Chemie Aktiengessellschaft. Catalyst and method of preparing same. 4,088,607, Cl. 252-466.0PT.
Weineck, Hans; and Maringer, Albert, to Siemens Aktiengesellschaft. Piezoelectric pressure pickup. 4,088,916, Cl. 310-338.000.
Weinhardt, Klaus: *See—*
Roszkowski, Adolph P.; Beard, Colin C.; Dvorak, Charles; and Weinhardt, Klaus, 4,088,771, Cl. 424-273.00R.
Weise, Lutz: *See—*
Lindemann, Klaus; Reinecke, Erich; and Weise, Lutz, 4,088,376, Cl. 303-96.000.
Weisigk, Gunther; Rippstein, Eugen; and Musterle, Eugen, to Siemens-Albis Aktiengesellchaft. Telecommunication systems with captive condition surveillance and release. 4,088,841, Cl. 179-18.0FG.
Welborn, Warren S.: *See—*
Diack, Archibald W.; Welborn, Warren S.; and Rullman, Robert G., 4,088,138, Cl. 128-419.00D.
Weller, Joseph F.: *See—*
Crowley, James D.; Weller, Joseph F.; and Giallorenzi, Thomas G., 4,088,969, Cl. 333-30.00R.
Wells, William R., to United Audio Visual Corporation. Method and apparatus for controlling external devices and for transferring information. 4,089,028, Cl. 360-79.000.
Wenrich, Thomas C.: *See—*
Wood, John L.; and Wenrich, Thomas C., 4,088,289, Cl. 248-2.000.
Wentink, William Stewart: *See—*
Castrodale, Daniel Owen; Pendy, William John, Jr.; and Wentink, William Stewart, 4,089,029, Cl. 360-99.000.
Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See—*
Karayannis, Panayotis, 4,088,076, Cl. 102-70.20G.
Werner, Peter: *See—*
Adler, Karl-Heinz; Drews, Ulrich; Werner, Peter; Moller, Heinz; and Kammerer, Heinz, 4,088,927, Cl. 315-209.00T.
Wescom, Inc.: *See—*
Gupta, Shanti S.; Bhatnagar, Vijaya K.; and Litster, John F., 4,088,851, Cl. 179-170.200.
West, William F.; and Correll, Curtis V., Sr. Arming device. 4,088,055, Cl. 89-1.50D.
Westinghouse Air Brake Company: *See—*
Adkins, Russell M., 4,088,385, Cl. 339-143.00R.
Noble, Peter M., 4,088,078, Cl. 104-26.00A.
Westinghouse Electric Corp.: *See—*
Bolin, Philip C., 4,088,826, Cl. 174-14.00R.
Charles, Robert G.; and Lindsay, William T., Jr., 4,088,946, Cl. 324-220.000.
Cohen, Paul; and Redding, Arnold H., 4,087,985, Cl. 60-644.000.
Elbling, Irving N.; and Saunders, Howard E., 4,088,809, Cl. 428-379.000.
Gilmour, George A., 4,088,978, Cl. 340-3.00R.
Hruda, Robert M., 4,088,859, Cl. 200-144.00B.
Humphrey, Joseph R.; Hickey, Mickey F.; and Nemeth, Ronald J., 4,088,466, Cl. 62-286.000.
Jones, Charles H.; and Douglas, George R., 4,088,907, Cl. 310-333.000.
Jones, Charles H.; and Gottlieb, Milton, 4,088,979, Cl. 340-5.00H.
Miller, Robert C.; and Mallick, George T., Jr., 4,088,899, Cl. 307-116.000.
Podolsky, Leaman B.; Groves, Charles L., Jr.; and Johnson, Steven J., 4,088,875, Cl. 364-494.000.
Rawls, Lucien E., 4,088,998, Cl. 343-112.00R.
Ruka, Roswell J., 4,088,543, Cl. 204-1.00T.
Shriver, Lloyd L., Jr., 4,088,802, Cl. 427-67.000.
Spengler, Charles J., 4,088,479, Cl. 75-171.000.
Thompson, Robert E.; Spurrier, Francis R.; and Jones, Andrew R., 4,088,535, Cl. 176-87.000.
Wu, Shu-Yau; Bluzer, Nathan; Francombe, Maurice H.; and Jensen, Arthur S., 4,088,546, Cl. 204-15.000.
Westling, Donald E. Liquid dispensing machine. 4,088,249, Cl. 222-486.000.
Westvaco Corporation: *See—*
Moorer, Howard H., 4,088,505, Cl. 106-277.000.
Osborne, Edward L., 4,088,261, Cl. 229-26.000.
Wetzel, Roland Herman, to Du Pont de Nemours, E. I., and Company. Process for preparing pigmentary quinacridone using low-salt milling. 4,088,506, Cl. 106-288.00Q.
Wetzig, Dieter, to Siemens Aktiengesellschaft. Electric unipolar machine. 4,088,911, Cl. 310-178.000.
Whatmough, Nigel Stephen: *See—*
Robinson, Frank; Girt, Keith Harry; and Whatmough, Nigel Stephen, 4,087,991, Cl. 66-189.000.
Wheatley, Carl Franklin, Jr., to RCA Corporation. Voltage reference circuits. 4,088,941, Cl. 323-8.000.
Wheldon, Robert Joseph, to English Electric Valve Company Limited. Electric circuit interrupting devices. 4,088,929, Cl. 315-347.000.
Whirlpool Corporation: *See—*
Bannister, James Edward; and Connor, Ralph Fredrick, 4,088,428, Cl. 418-270.000.
White, Allen Andrew; Yatcilla, George; and Fleming, Garold Lee, to Hesston Corporation. Slackening mechanism for bale tier. 4,088,068, Cl. 100-3.000.
White, Charles F., to TBW Ind. Inc. High volume pneumatic tank. 4,088,373, Cl. 302-53.000.
White, Robert J., to Chevron Research Company. Solids removal and fluid catalytic cracking of a synthetic hydrocarbon stream derived from hydrocarbon-containing solids. 4,088,567, Cl. 208-113.000.
Whitesides, George M.; Garrett, Patricia E.; and Siegel, Merrell, to Massachusetts Institute of Technology. Production of acyl phosphate salts. 4,088,675, Cl. 260-501.210.
Whitney, Thomas A.: *See—*
Langer, Arthur W., Jr.; and Whitney, Thomas A., 4,088,666, Cl. 260-439.00R.
Whittaker Corporation: *See—*
Holzrichter, Edward Julius, 4,088,619, Cl. 260-29.40R.
Wickham, Robert G.: *See—*
Dulin, Patrick J.; Gorman, Thomas G.; Robb, Neil E.; and Wickham, Robert G., 4,088,423, Cl. 416-210.00R.
Widdig, Arno: *See—*
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,088,780, Cl. 424-300.000.

Widmyer, Richard H., to Texaco Inc. High vertical conformance steam injection petroleum recovery method. 4,088,188, Cl. 166-269.000.
Wiegand, Donald E., to Conwed Corporation. Reinforced thermoplastic foam sheet. 4,088,805, Cl. 428-310.000.
Wiese, Harry C.; Denchfield, Jerrold R.; Ahlborn, John C., deceased; and by Ahlborn, Lloyd Keys, executor, to Texaco Inc. Production of solid fuel-water slurries. 4,088,453, Cl. 44-51.000.
Wiklund, Henry: *See—*
Nilsson, Goran Alfred; Edstrom, Kjell; and Wiklund, Henry, 4,088,062, Cl. 91-50.000.
Wild, Jost: *See—*
Sigg-Grutter, Trudi; and Wild, Jost, 4,088,688, Cl. 260-586.00D.
Wild, Peter J.: *See—*
Kmetz, Allan R.; and Wild, Peter J., 4,088,992, Cl. 340-336.000.
Wilde, Sheldon L., to H-C Industries Inc. Method and apparatus for forming closure inserts. 4,088,730, Cl. 264-268.000.
Wilgus, Donovan R.; and King, John M., to Chevron Research Company. Mannich base composition. 4,088,586, Cl. 252-51.50R.
Wilhelm, Adolf: *See—*
Ratz, Adolf; Wilhelm, Adolf; Odenwald, Gerhard; Frank, Siegfried; and Stark, Walter, 4,088,047, Cl. 76-112.000.
Wilhelm, Rudolf; and Heitmann, Jurgen, to Robert Bosch GmbH. Color bar generator. 4,089,026, Cl. 358-10.000.
Wilkalis, John Edward: *See—*
Pieters, Wim Johan Meindert; Gates, William Ellis; Carlson, Emery John; and Wilkalis, John Edward, 4,088,705, Cl. 260-653.700.
Wilkinson, Jack E.: *See—*
Grieshaber, Herman R.; and Wilkinson, Jack E., 4,087,878, Cl. 15-111.000.
William H. Rorer, Inc.: *See—*
Diamond, Julius; and Douglas, George H., 4,088,785, Cl. 424-322.000.
Wm. Wrigley Jr. Company: *See—*
Ream, Ronald L.; and Moore, David M., 4,088,788, Cl. 426-3.000.
Williams, Frank N., to Bradley Corporation. Seal member for faucet valve. 4,088,302, Cl. 251-361.000.
Williams, Jerry K.: *See—*
Winchell, Frank J.; Winkelmann, Klaus O.; Mrlik, Jerry R.; Denzer, Richard E.; and Williams, Jerry K., 4,088,338, Cl. 280-220.000.
Williams, Michael Kevin, to Procter & Gamble Company, The. Low sudsing detergent compositions. 4,088,598, Cl. 252-135.000.
Willis, Daniel H., to Phillips Petroleum Company. Promoters in the polymerization of monovinyl-aromatic compounds with primary lithium initiators. 4,088,813, Cl. 526-173.000.
Wilmot-Breeden Limited: *See—*
Jeavons, Philip Swingewood, 4,088,356, Cl. 292-359.000.
Wilmshurst, Trevor H.: *See—*
Dyer, David; and Wilmshurst, Trevor H., 4,089,055, Cl. 364-551.000.
Wilsher, Brian: *See—*
Millward, John David; Wilsher, Brian; and Mumford, Ronald, 4,088,399, Cl. 352-27.000.
Wilson, John Edward; and Hengen, Edward John, to Deere & Company. Combine crop feeding system. 4,087,953, Cl. 56-14.600.
Wilson, John Gerald: *See—*
Hunt, Frederick Charles; and Wilson, John Gerald, 4,088,747, Cl. 424-1.000.
Wilson, William J. Sequence checking device. 4,088,877, Cl. 235-419.000.
Wilt, Charles R., Jr.; and Schauermann, Floyd L., to Salem Corporation. Method of operating an incinerator. 4,087,923, Cl. 34-32.000.
Winchell, Frank J.; Winkelmann, Klaus O.; Mrlik, Jerry R.; Denzer, Richard E.; and Williams, Jerry K., to General Motors Corporation. Cambering vehicle with cable stabilizer and equalizer. 4,088,338, Cl. 280-220.000.
Winderman, Jay B., to General Dynamics Corporation. Single channel monopulse radar system. 4,088,997, Cl. 343-16.00M.
Wineburner, Ronald E.; and Allen, Norman R., to Caterpillar Tractor Co. Brake-one way winch. 4,088,305, Cl. 254-187.500.
Winfield Brooks Company: *See—*
Perry, Kenneth E., 4,087,943, Cl. 51-317.000.
Winkelmann, Klaus O.: *See—*
Winchell, Frank J.; Winkelmann, Klaus O.; Mrlik, Jerry R.; Denzer, Richard E.; and Williams, Jerry K., 4,088,338, Cl. 280-220.000.
Winn, Martin; and Kyncl, Jaroslav, to Abbott Laboratories. 5,6-Dimethoxy-2-heterocyclic benzimidazoles. 4,088,765, Cl. 424-258.000.
Winter, Karl, to Ceagfilter und Entstaubungstechnik GmbH. Purifying an air or gas stream containing combustible vaporous or gaseous impurities. 4,088,460, Cl. 55-208.000.
Wirth, Armin; Wirth, Johannes; and Gallo, Mario, to Wirth, Gallo & Co. Mass and force meter. 4,088,014, Cl. 73-141.00R.
Wirth, Armin, to Wirth, Gallo & Co. Load lever. 4,088,198, Cl. 177-258.000.
Wirth, Gallo & Co.: *See—*
Wirth, Armin; Wirth, Johannes; and Gallo, Mario, 4,088,014, Cl. 73-141.00R.
Wirth, Armin, 4,088,198, Cl. 177-258.000.
Wirth, Johannes: *See—*
Wirth, Armin; Wirth, Johannes; and Gallo, Mario, 4,088,014, Cl. 73-141.00R.
Wisconsin Alumni Research Foundation: *See—*
Sih, Charles J., 4,088,536, Cl. 195-30.000.
Wittmeier, George F. Can crusher for reducing cans or similar containers to a compact form. 4,088,072, Cl. 100-283.000.
Wlezien, Richard A.: *See—*
Rose, Edgar; and Wlezien, Richard A., 4,088,098, Cl. 123-73.00A.
Wolanyk, Michael A.: *See—*
Raetzch, Carl W.; Cunningham, Hugh; Darlington, William B.; Blanchfield, Richard J.; Wolanyk, Michael A.; and Cote, Robert, 4,088,551, Cl. 204-129.000.
Wolf, Gunter: *See—*
Hofen, Willi; Prescher, Gunter; Siekmann, Gerd; and Wolf, Gunter, 4,088,676, Cl. 260-502.00R.
Wolfe, Robert W., to Coleman Mfg. Co. Window assembly. 4,087,941, Cl. 49-450.000.
Wolfe, Robert W., to GTE Sylvania Incorporated. Cerium magnesium aluminate luminescent compositions, and lamps utilizing same. 4,088,922, Cl. 313-486.000.
Wolfer, Peter, to Kistler Instrumente AG. Force measuring apparatus with mounting arrangement. 4,088,015, Cl. 73-141.00R.
Wolff, Erich: *See—*
Krafft, Werner; Matschke, Gunther; and Wolff, Erich, 4,088,493, Cl. 96-77.000.
Wolfrum, Gerhard: *See—*
Kalz, Dietmar; and Wolfrum, Gerhard, 4,088,651, Cl. 260-287.00H.
Wollweber, Hartmund: *See—*
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,088,780, Cl. 424-300.000.
Woo, Gar Lok, to Chevron Research Company. Linear alkyl hydrocarbyloxybenzene disulfonates. 4,088,680, Cl. 260-512.00R.
Wood, Eric. Offshore platforms. 4,087,983, Cl. 61-86.000.
Wood, John L.; and Wenrich, Thomas C., to Gardner-Denver Company. Mast support arrangement for portable drill rig. 4,088,289, Cl. 248-2.000.
Wood, Louis L.; Murray, Jerome L.; and Gardiner, Frances R., to W. R. Grace & Co. Hydrophilic polyurethane foams for use in catamenial devices. 4,088,132, Cl. 128-285.000.
Woodford Manufacturing Company: *See—*
Fillman, Russell L.; and Yoon, Young Z., 4,087,876, Cl. 14-72.500.
Woodruff, William C.; Lombardo, Dennis M.; and Horrell, Theodore H., Jr., to General Motors Corporation. Diesel engine warm-up control system. 4,088,109, Cl. 123-179.00H.
Woodward Governor Company: *See—*
Avery, Paul A., 4,087,961, Cl. 60-39.28R.
Woog, Heinrich; Gruber, Werner; and Rothe, Werner, to Boehringer Mannheim GmbH. Injectable pharmaceutical solutions. 4,088,759, Cl. 424-240.000.
Wright, Antony P.: *See—*
Malek, James R.; Speier, John L.; and Wright, Antony P., 4,088,669, Cl. 260-448.80R.
Wu, Shu-Yau; Bluzer, Nathan; Francombe, Maurice H.; and Jensen, Arthur S., to Westinghouse Electric Corp. Method of electroplating interconnections. 4,088,546, Cl. 204-15.000.
Xerox Corporation: *See—*
Ayash, Karl B., 4,088,481, Cl. 96-1.400.
Crystal, Richard G.; and Walton, Frank J., 4,088,073, Cl. 101-128.400.
Ing, Samuel Wei; and Schmidlin, Fred William, 4,088,485, Cl. 96-1.50R.
Kingsley, William, 4,088,403, Cl. 355-16.000.
Rees, James D.; and Hemphill, Kent W., 4,088,401, Cl. 353-122.000.
Suga, Gojiro; and Hirasaki, Takashi, 4,089,008, Cl. 354-5.000.
Yabuki, Takashi; Shidara, Naohiro; and Kimura, Tomoaki, to Hitachi, Ltd. Cooling guide system for continuous casting machine. 4,088,179, Cl. 164-441.000.
Yajima, Kenji, to Kabushiki Kaisha Daini Seikosha. Electronic timepiece switch mechanism having substrate mounted pivoted contact and lever or cam actuator. 4,088,854, Cl. 200-6.00R.
Yakobshe, Richard Yakubovich: *See—*
Medovar, Boris Izrailevich; Efimov, Viktor Alexeevich; Shevtsov, Viktor Lvovich; Artamonov, Viktor Leonidovich; Bogachenko, Alexei Georgievich; Marinsky, Georgy Sergeevich; Sagan, Vitaly Ivanovich; Shtanko, Jury Pavlovich; and Yakobshe, Richard Yakubovich, 4,088,295, Cl. 249-79.000.
Yamaguchi, Akihide: *See—*
Akado, Hajime; Kawashima, Yutaka; Yamaguchi, Akihide; and Matsuura, Hideki, 4,087,966, Cl. 60-278.000.
Yamaguchi, Akihiro: *See—*
Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, 4,088,484, Cl. 96-1.50R.
Yamaguchi, Takashi: *See—*
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu; Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, 4,088,213, Cl. 193-40.000.
Yamamoto, Eiji; and Ohta, Koji, to Kabushikikaisha Tokyo Keiki. Ultrasonic flaw detector. 4,088,029, Cl. 73-612.000.
Yamamoto, Yoshio; Sono, Masaki; and Ekeuti, Masahiko, to Matsushita Electric Industrial Co., Ltd. Printed circuit board. 4,088,828, Cl. 174-68.500.
Yamashita, Hisakuni: *See—*
Murase, Yoshitaka; Okada, Noboru; Yoshikawa, Iwashiro; Takeuchi, Tsutomu; and Yamashita, Hisakuni, 4,088,527, Cl. 156-502.000.
Yamashita, Kazutaka: *See—*
Takamori, Shigeru; Yamashita, Kazutaka; and Kono, Yoshinao, 4,088,707, Cl. 260-835.000.
Yanagiuchi, Tatsuo: *See—*
Nakamura, Takahiro; Inoue, Yoriyuki; Yanagiuchi, Tatsuo; Houji, Kazuo; Yamaguchi, Takashi; Furukawa, Wataru; Itoh, Susumu;

Kanaya, Tadashi; Ichiishi, Tuneo; and Osaka, Akira, 4,088,213, Cl. 193-40.000.

Yankee, Ernest W., to Upjohn Company, The. Cis-4,5-didehydro-cis-13-PGF$_1$ compounds. 4,088,663, Cl. 260-408.000.

Yasuhira, Nobuo: *See*—
Nihongi, Yutaka; and Yasuhira, Nobuo, 4,088,620, Cl. 260-29.4UA.

Yasumoto, Yosiro: *See*—
Suzuki, Hiroshi; Ito, Yukio; and Yasumoto, Yosiro, 4,088,611, Cl. 252-541.000.

Yatcilla, George: *See*—
White, Allen Andrew; Yatcilla, George; and Fleming, Garold Lee, 4,088,068, Cl. 100-3.000.

Yeh, Chuen Y.; Bohn, F. Lewis; and Ulmer, Harry E., to Allied Chemical Corporation. Recovery of phenol values from purification residues. 4,088,703, Cl. 568-835.000.

Yiannoulos, Aristides Antony, to Bell Telephone Laboratories, Incorporated. Fabrication of semiconductor integrated circuit structure including injection logic configuration compatible with complementary bipolar transistors utilizing simultaneous formation of device regions. 4,087,900, Cl. 29-578.000.

Yokohama Rubber Co., Ltd., The: *See*—
Murase, Yoshitaka; Okada, Noboru; Yoshikawa, Iwashiro; Takeuchi, Tsutomu; and Yamashita, Hisakuni, 4,088,527, Cl. 156-502.000.

Yoon, Young Z.: *See*—
Fillman, Russell L.; and Yoon, Young Z., 4,087,876, Cl. 14-72.500.

Yoshida Kogyo K.K.: *See*—
Nagase, Mitsuo, 4,087,950, Cl. 52-397.000.

Yoshida, Makoto, to Aupac Kabushiki Kaisha. Brush device for miniature electric motor. 4,088,912, Cl. 310-244.000.

Yoshida, Tadao: *See*—
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, 4,089,049, Cl. 363-17.000.

Yoshikawa, Iwashiro: *See*—
Murase, Yoshitaka; Okada, Noboru; Yoshikawa, Iwashiro; Takeuchi, Tsutomu; and Yamashita, Hisakuni, 4,088,527, Cl. 156-502.000.

Yoshioka, Teruo; and Iwanami, Shinichi, to Fujisash Industries, Ltd. Process and apparatus for separating oil from water contaminated with oil. 4,088,578, Cl. 210-73.00W.

Young, Peter L., to Corning Glass Works. Thin film tantalum oxide capacitor. 4,089,039, Cl. 361-322.000.

Yu, Arthur J.: *See*—
Spak, Anthony J.; and Yu, Arthur J., 4,088,710, Cl. 260-870.000.

Yuan, Sun-Shine: *See*—
Bodor, Nicolae S.; and Yuan, Sun-Shine, 4,088,783, Cl. 424-313.000.

Yukimoto, Sadao; and Ishihara, Tadayoshi, to Matsushita Electric Industrial Co., Ltd. Speaker voice coil construction. 4,088,847, Cl. 179-115.5VC.

Zahn, Heinrich. Helical scan VTR tape deck with resiliently mounted scanning assembly. 4,089,030, Cl. 360-137.000.

Zahn, Wolfgang; and Nagel, Erich, to Agfa-Gevaert Aktiengesellschaft. Apparatus for applying markers to webs of photographic material in copying machines. 4,088,404, Cl. 355-29.000.

Zaitseva, Antonida Vasilievna: *See*—
Glushkov, Robert Georgievich; Mashkovsky, Mikhail Davydovich; Andreeva, Natalia Ivanovna; Liberman, Serafima Solomonovna; Gerchikov, Leonid Nikonovich; Volskova, Vera Alexeevna; Zaitseva, Antonida Vasilievna; Magidson, Onisim Julievich, deceased; Magidson, Galina Konstantinovna; and Magidson, July Onisimovich, administrators, 4,088,647, Cl. 544-343.000.

Zankl, Frank: *See*—
Lohneis, Earl R.; and Zankl, Frank, 4,087,901, Cl. 29-568.000.

Zappelli, Piergiorgio; Re, Luciano; and Marconi, Walter, to Snamprogetti, S.p.A. Macromolecular adenine nucleotide derivatives. 4,088,639, Cl. 260-112.50R.

Zbikowski, Ted: *See*—
Garrett, Wayne H.; Stringer, Theodore H., III; and Zbikowski, Ted, 4,088,206, Cl. 188-196.00D.

Zebus, Paul P.: *See*—
United States of America, National Aeronautics and Space Administration; Zebus, Paul P.; Packer, Poley N.; and Haynie, Cyrus C., 4,088,312, Cl. 269-21.000.

Zecher, Wilfried; Dunwald, Willi; and Merten, Rudolf, to Bayer Aktiengesellschaft. Process for the production of polycondensates containing imide groups. 4,088,637, Cl. 260-77.5TB.

Zephyr Wind Dynamo Company: *See*—
Gillette, Willard D., 4,087,990, Cl. 64-2.00P.

Zeuthen, Karl Gustav, to Rex-Rotary International A.S. Fuser cooling system. 4,088,868, Cl. 219-216.000.

Zhitetsky, Leonid Sergeevich; and Fainzilberg, Leonid Solomonovich. Digital device for automatically checking carbon content in metal with reference to temperature stops on cooling curve. 4,088,974, Cl. 364-472.000.

Zhukov, Viktor Vasilievich: *See*—
Popov, Gennady Petrovich; Mikhailidi, Alexandr Konstantinovich; Lavrentiev, Konstantin Andreevich; Popov, Ivan Grigorievich; Zhukov, Viktor Vasilievich; and Sorokin, Nikolai Alexeevich, 4,088,609, Cl. 252-512.000.

Zimmermann, Gert, to F. Zimmermann & Co. Arrangement for counting different-denomination coins and similar disk-shaped objects. 4,088,144, Cl. 133-3.00F.

Zipser, Randall E.; Butler, Gene R.; and Grey, Donald M., to Sperry Rand Corporation. Apparatus for repositioning bales on a bale wagon. 4,088,231, Cl. 214-6.00B.

Zoursel, Pierre Edouard, to Automobiles Peugeot. Device for the simultaneous control of the driving-mirrors of an automobile vehicle. 4,088,398, Cl. 350-280.000.

Zucker, Jerry, to Hudson Pulp & Paper Corp. Method and apparatus for recovering saponified oil. 4,088,638, Cl. 260-97.500.

Zucker, Joseph; and Lauer, Robert, to GTE Laboratories Incorporated. Large bandwidth optical communication systems utilizing an incoherent optical source. 4,088,389, Cl. 350-96.150.

Zurmahr, Horst, to Sack GmbH. Cooling device for slabs with slab-tilting devices for turning the rolled stock. 4,088,309, Cl. 266-130.000.

Zwillinger, Daniel, to McGraw-Edison C.mpany. Microwave oven with torsion bar hinge. 4,088,861, Cl. 219-10.55D.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 9TH DAY OF MAY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Allen, Clifford H. Positive displacement rotary pump and drive coupling therefor. Re. 29,626, Cl. 241-46.110.

Boehringer Ingelheim GmbH: *See*—
Keck, Johannes; Noll, Klaus-Reinhold; Pieper, Helmut; Kruger, Gerd; and Puschmann, Sigfrid, Re. 29,628, Cl. 560-37.000.

Brown & Williamson Tobacco Corporation: *See*—
Summers, Thomas Wade, Re. 29,625, Cl. 209-469.000.

Burroughs Corporation: *See*—
Ogle, James A., Re. 29,629, Cl. 313-217.000.

Calspan Corporation: *See*—
Weatherston, Roger C., Re. 29,627, Cl. 418-9.000.

Dowty Fuel Systems Limited: *See*—
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Levine, Alfred B. Multiplexed electrostatic copier having plural scan stations and common development. 247,853, 5-9-78, Cl. D16-27.000.

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